

# AN ECONOMIC COMPARISON OF ARIZONA AND NEVADA, WITH AN EMPHASIS ON EDUCATION

**February 2016**

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## TABLE OF CONTENTS

Summary	1
General Comparison	6
Economic Development	11
Education Funding	30
Economic Profile	49
Economic Performance	63

## LIST OF TABLES

1. Metropolitan Areas	6
2. Percentage With at Least a Bachelor's Degree, 2010-14 Average	14
3. High School Graduation Rates at Public Schools	18
4. Infrastructure Grades	19
5. State and Local Government Taxes Paid by Individuals in 2014 as a Percentage of the Median of 51 Cities	23
6. State and Local Government Taxes Paid by Businesses in Fiscal Year 2014	24
7. Elementary and Secondary Education Finance, Fiscal Year 2013	33
8. Elementary and Secondary Education Finance, Fiscal Years 1992 Through 2013	34
9. Employment-to-Population Ratio, 2010-14 Average	49
10. Gross Domestic Product and Employment by Industrial Sector, 2014	51
11. Employment and Wages by Occupational Group, 2014	52
12. Annual Average Percent Change in Aggregate Economic Measures by Economic Cycle	72

## LIST OF CHARTS

1. Age Distribution, 2014	7
2. Net Migration and Net Natural Change by Decade	9
3. Educational Attainment of Workers Between the Ages of 25 and 64, 2010-14 Average	16
4. State and Local Government Tax Burden: Per Capita Taxes Paid as a Percentage of Per Capita Income	22
5. Per Capita Number of Graduate Students and Postdoctorates in Science and Engineering, Expressed as a Percentage of the National Average	26
6. Number of Utility Patents Granted Per 1 Million Residents	27
7. Industry Research and Development Expenditures Per \$1 Million of Gross Domestic Product	28
8. Venture Capital Granted Per \$1 Million of Gross Domestic Product	29
9. Enrollment at Public Elementary and Secondary Schools Per 1,000 Residents	31
10. Enrollment at Public Institutions of Higher Education Per 1,000 Residents	37
11. Noncapital Expenditures for Public Higher Education From the State Government General Fund, Not Adjusted for Inflation or the Change in Enrollment	39
12. Public Higher Education Share of State Government General Fund Noncapital Expenditures	39
13. Noncapital Expenditures for Public Higher Education From the State Government General Fund, Arizona as a Percentage of Nevada	40
14. Noncapital Expenditures for Public Higher Education From the State Government General Fund Per Full-Time-Equivalent Student, Inflation Adjusted	41
15. Noncapital Expenditures for Public Higher Education by State and Local Governments Per Full-Time-Equivalent Student as a Percentage of the National Average	43
16. Noncapital Appropriations for Public Higher Education Per Full-Time-Equivalent Student as a Percentage of the National Average	45
17. Noncapital Funding for Public Higher Education Per Full-Time-Equivalent Student, Arizona as a Percentage of Nevada	47
18. Noncapital Funding for Public Higher Education Per Full-Time-Equivalent Student as a Percentage of the National Average	48
19. High-Technology Employment Defined by Occupational Group as a Share of Total Employment	56
20. Median Hourly Wage by Occupational Group, 2014	58
21. High-Technology Employment Defined by Industry as a Share of Total Nonfarm, Private-Sector Employment	59
22. International Exports as a Share of Gross Domestic Product	62
23. Gross Domestic Product Per Worker Ratios	65
24. Earnings Per Worker Ratios	65
25. Per Capita Personal Income Ratios	66
26. Gross Domestic Product Per Capita Ratios	68
27. Unemployment Rates	68
28. Median Household Income Ratios	69
29. Poverty Rates	69
30. Annual Percent Change in Inflation-Adjusted Gross Domestic Product	71
31. Annual Percent Change in Total Employment	71

## **SUMMARY**

Evaluations of the business climate in Nevada place it below the national average and near the bottom of the western states, while Arizona ranks among the middle of the states. Two factors are of key importance to 21st-century economic development. The quality and availability of the labor force — which is largely determined by educational achievement and attainment — is evaluated more highly in Arizona than in Nevada, though Arizona receives a poor grade. The quality and availability of the physical infrastructure is rated similarly in Nevada and Arizona, among the middle of the states. The two states also are similar and in the middle of the states on business costs. Arizona compares much more favorably than Nevada on measures of high technology and innovation, though even Arizona is mediocre from a national perspective.

Measures of aggregate economic growth, such as gross domestic product and employment, often receive the greatest attention, but the ultimate goal of economic development is to enhance the prosperity of an area, not to increase the area's economic size. Increases in productivity must be realized in order to achieve gains in prosperity. By state, there is no true measure of productivity; per worker measures are used as proxies. Historically, Nevada compared more favorably than Arizona on such measures, but in recent years the two states are comparable, each below the national average.

On measures of prosperity relative to the U.S. average, Nevada historically compared more favorably and Arizona less favorably. Relative to the nation, Arizona's performance has dropped over time while declines in Nevada have been greater. However, prosperity in Nevada remains higher than in Arizona on most measures. Relative to Arizona, median household income is higher in Nevada, the poverty rate is lower in Nevada, and per person measures such as per capita personal income and per capita gross domestic product are still higher in Nevada than in Arizona.

Thus, on most of the measures of prosperity and productivity, both states have declined relative to the U.S. average, but the decreases have been much larger in Nevada. On prosperity measures, Nevada still compares favorably to Arizona.

## **Economic Development**

The quality and availability of the labor force typically is evaluated through measures of educational achievement and attainment. Educational achievement and attainment is affected by a number of conditions, including income, whether English is a child's first language, and the educational attainment of a child's parents. Since these factors are correlated to race/ethnicity, significant variations in test scores and educational attainment exist across racial/ethnic groups.

Educational attainment, typically measured as the share of adults with at least a high school diploma or as the share who have earned at least a bachelor's degree, is below the national average in Arizona; attainment in Nevada is considerably lower than in Arizona. Among those born in the same state in which they reside as an adult, educational attainment in the two states is similar but below the national average of nonmigrants. Immigrants to the two states also have similar attainments, but domestic migrants to Arizona are better educated than those who moved to Nevada, though still less well educated than the typical interstate migrant.

Achievement can be measured using test scores. Students in Nevada and Arizona score below the national average on such subjects as reading, mathematics, and science. The scores are similar in Arizona and Nevada at the fourth-grade level, but Arizona's eighth-grade students score more highly. However, each state scores at the national average after controlling for the educational attainment of the parents. Thus, in each state, the low scores are directly a result of the subpar educational attainment of the parents and related socioeconomic measures.

Depending on the type of physical infrastructure, the quality and availability may be either a public-sector responsibility or a private-sector concern. The public sector has the primary responsibility for roads, highways and transit and for water and wastewater services. The private sector is largely responsible for energy production and telecommunications.

The physical infrastructure is rated comparably in Nevada and Arizona, each ranking in the middle of the states. State and local governments in Nevada typically have spent relatively more on capital outlays than their counterparts in Arizona.

Business costs are another of the economic development factors, but public policy has little effect on most costs, such as the cost of labor, real estate prices, and energy costs. Taxes are the primary exception. State and local government taxes are not a significant expense for most businesses and therefore play a limited role in economic development. Moreover, taxes are evaluated by both businesses and individuals relative to the quality and availability of valued public services.

Total state and local government taxes — including taxes paid by individuals and businesses — are lower in Arizona than in Nevada after adjusting for the difference in size of the two states, with even the Nevada figure below the U.S. average. This comparison is misleading, however, given Nevada's use of gaming taxes, which are largely paid by nonresidents. After considering this tax exporting, the tax burden is lower in Nevada than in Arizona, with each state considerably below the national average. Except at low income levels, the tax burden on individuals is below the national average in both states, with much lower taxes in Nevada than in Arizona.

In recent years, the reported tax burden on businesses has been higher in Nevada than in Arizona. Business taxes in Arizona and Nevada have been average relative to the services businesses receive. Since business taxes are much more important than individual taxes to economic development, the states have been rated similarly on the tax burden in economic development studies despite Nevada's lower overall tax burden. However, the two states have diverged on the business tax burden since the last comparison was made. Arizona has begun to phase in significant reductions to the corporate income tax, while Nevada increased various business taxes in 2015.

In the 21st-century economy, technology and innovation are taking on increasingly important roles in economic development. Both human and financial capital are especially important to high-technology and innovative activities. On each of the human capital measures examined, Arizona compares more favorably than Nevada, but Arizona is below the national average. On

the measures of financial capital, Arizona ranges from above to below the U.S. average, but Nevada is far below average on each.

### **Education Funding**

During the last economic recession, Arizona and Nevada each state faced a very large budget deficit and was restricted in their response to the deficit by having a constitutional requirement for a two-thirds vote of the Legislature to pass a revenue increase. The states employed similar strategies to balance the budget, including significant spending reductions. However, the two states took very different approaches to balancing the budget during the 2015 legislative session.

In Arizona, due to a projected deficit (that did not materialize), the Legislature took a number of actions similar to those employed during the last recession, including spending reductions. In Nevada, the governor proposed a significant package of revenue increases, totaling \$1.1 billion. The proposal passed each legislative house by more than the two-thirds required. This package extended some of the temporary revenue increases that had been implemented during the recession and made others permanent. It also included a significant increase in cigarette taxes and increases in business taxes. In addition to raising business license fees, a modified gross receipts tax was created.

### **Elementary and Secondary Education**

Since most children attend public schools, public policy plays a significant role in a state's educational performance. Funding is a primary input into the educational system and is dependent on state and local government revenues. Current operations funding per pupil in elementary and secondary schools is very low in both Arizona and Nevada, with each state ranking among the bottom five states in fiscal year (FY) 2013. Relative to the U.S. average, each state's expenditures have declined over time, with a larger decrease in Arizona. In FY 1992, Arizona's per pupil spending was 21 percent less than the national average; by FY 2013 it was 41 percent less. In Nevada, per pupil spending dropped from 12 percent below average in FY 1992 to 24 percent less than the national average in FY 2013. The decrease in funding was particularly large between FYs 2008 and 2013. The cost of living is almost the same in Arizona as in Nevada, so adjusting spending for living costs has little effect on the comparison of the two states.

The proceeds from Nevada's 2015 tax increase are intended to be used for elementary and secondary education, including all-day kindergarten, expansion of reading programs, more resources for English language learners, and reductions in class size. The increase in revenue, which is intended to be permanent, should improve the state's ranking, but Nevada's funding per pupil will remain below average.

In contrast, Arizona also is planning for a funding increase for elementary and secondary education, but this is a temporary measure that will last only 10 years, and is subject to a public vote in a special election in May 2016. Most of the funding increase will come from the state's permanent fund (land trust), not from taxes. Even with the proposed increase in funding for elementary and secondary education, Arizona will be far below the national average. In addition to the temporary nature of this funding proposal, the portion of the sales tax that is dedicated to education expires in 2021.

## Higher Education

In this report, higher education is defined as the combination of community colleges and universities. In fiscal year 1999, public higher education funding as a share of the noncapital state government general fund budget was nearly 15 percent in Arizona and 19 percent in Nevada. Since then, the higher education share has fallen more in Arizona than Nevada; the share in FY 2016 is 7.9 percent in Arizona and 14.5 percent in Nevada.

Noncapital appropriations for public higher education from the state government general fund, expressed per full-time-equivalent (FTE) student, are projected to be 61 percent lower in Arizona than in Nevada in FY 2016. This is a significant shift from the historical relationship. From FYs 1999 through 2001, the figures were 21 percent lower in Arizona than in Nevada.

This comparison of higher education appropriations per FTE student does not take into account differences in the higher education systems, or in the funding of higher education, in Arizona and Nevada. All institutions of higher education in Nevada are part of one system that is funded by state government. In Arizona, community colleges are separate from universities, with only a small portion of their funding coming from state government — the rest comes from local governments. Only a minority of states use local government funds to support higher education; Arizona's local government funding per FTE student is the highest in the nation. Local government funds in Arizona flow only to community colleges.

Thus, combined state and local government appropriations for higher education provide a more accurate comparison of the overall support for public higher education in the two states. The State Higher Education Executive Officers Association provides such a measure for the FY 2000-through-2014 period. Arizona and Nevada historically provided similar support for public higher education — the educational appropriation per FTE student in Arizona was only slightly lower than in Nevada from FYs 2000 through 2003. Each state was a little below the national average. Nevada significantly boosted funding for higher education in FY 2004, putting it well above the U.S. average and Arizona.

Relative to the nation, the appropriation for higher education per FTE student fell in each state after FY 2009, though the decreases were larger in Arizona. Arizona's figure was 20 percent less than that for Nevada from FYs 2012 through 2014. In FY 2014, Arizona's figure was 19 percent less than the U.S. average, ranking 34th among the 50 states. Nevada's figure was 2 percent greater than average and ranked 17th.

The states diverged further in FY 2016 on higher education funding, with an increase in Nevada and cuts in Arizona, including a reduction of nearly \$100 million in the budget for the universities and the elimination of state funding for the largest community college districts.

The two states also have differed on tuition rates for higher education. Through FY 2007, average tuition per FTE student in Arizona was a little below the national average, but the tuition rate in Nevada was considerably below average. Since then, tuition has increased significantly at Arizona's universities, pushing average tuition per FTE student for all of higher education to 16 percent above average in FY 2014. The figure in Nevada was 34 percent below the U.S. norm.



### **Economic Profile**

The sectoral composition of the economy is somewhat different from the national average in Arizona and considerably different in Nevada. Comparing the two states, the big difference is in activities related to tourism and gaming. Nevada's sectoral shares are considerably higher in the accommodation and food services sector and in the arts, entertainment and recreation sector. Arizona has higher shares in several sectors, including manufacturing, information, finance and insurance, and administrative services. Each state, but especially Nevada, has a deficit of jobs in high-paying sectors and an excess in low-wage sectors. As a result, sectoral job quality is less than the national average in Arizona and far below average in Nevada.

Differences between the states also are present in occupational shares of the total economy. The occupational mix in Arizona is similar to the national average, but the mix in Nevada is much different. In particular, Nevada has higher shares of its workers engaged in food preparation and serving, personal care, and cleaning and maintenance occupations — in large part related to tourism and gaming. Nevada has a deficit of jobs in high-paying occupational groups and an excess in low-wage groups. As a result, occupational job quality is considerably below average in Nevada, but near the national average in Arizona.

Based on both occupational and industrial data, high-technology activities account for about the same share of total employment in Arizona as the national average, while the shares in Nevada are only about one-half as much. As defined by industry, there is no trend in the high-tech share nationally or in Nevada, while the share is trending down in Arizona. Defined by occupation, the high-tech share has been slightly rising nationally and in Arizona, but holding steady in Nevada.

### **Economic Performance**

On the proxy measures of productivity, Arizona and Nevada have declined relative to the national average, with a larger drop in Nevada. Each state was about 10 percent below the national average in 2014.

On the prosperity measures, each state has declined over time relative to the nation. The decrease has been greater in Nevada, which has gone from above to below the national average. However, except on the unemployment rate in recent years, Nevada still compares more favorably than Arizona. In 2014, per capita gross domestic product was 12 percent below average in Nevada and 21 percent below average in Arizona. Relative to the national average, per capita personal income was 12 percent below average in Nevada and 18 percent below average in Arizona. Over the 2010-through-2014 period, median household income was 2 percent below average in Nevada and 7 percent below average in Arizona; the poverty rate in Nevada was equal to the U.S. figure of 15.6 percent while Arizona's figure was 18.2 percent.

Aggregate economic growth — such as the percent change in employment or gross domestic product — is not correlated to gains in prosperity and productivity. Historically, aggregate economic growth rates in Arizona and Nevada generally were considerably higher than the national average, with the states alternating between which was growing faster. Since 2007, however, aggregate growth rates in each state have been only equal to the national average.

## GENERAL COMPARISON

Arizona and Nevada share a border and are similar in many respects. A significant difference between the states is the widespread legality of gaming in Nevada, the effect of which is reflected in various economic measures and in the state's revenue system.

The land area in Arizona is only slightly larger than in Nevada, but Arizona's population of 6.83 million in 2015 was 2.4 times higher than Nevada's 2.89 million. In both states, a high share of the residents — 95 percent in Arizona and 90.5 percent in Nevada — lived in metropolitan areas in 2014, based on population estimates made by the U.S. Department of Commerce, Census Bureau.

The 4.5 million residents of the Phoenix-Mesa-Scottsdale metropolitan area accounted for two-thirds of the Arizona total. Another 1.0 million people (15 percent of the state total) lived in the adjacent Tucson metro area. The combined population of five other metro areas — Flagstaff, Lake Havasu City-Kingman, Prescott, Sierra Vista-Douglas, and Yuma — accounted for 13 percent of the state's total (see Table 1). The Phoenix metro area is even more dominant based on gross domestic product (GDP), accounting for three-fourths of the state's total.

Las Vegas-Henderson-Paradise, the largest metro area in Nevada, accounts for an even larger share of Nevada's population, at 73 percent, though its 70 percent share of the state's GDP is a little less than the share contributed by the Phoenix metro area to Arizona. The Reno metro area accounts for a little larger share of the Nevada population and GDP than the Tucson metro area's shares in Arizona. Nevada has only one other metro area (Carson City barely meets the standard for a metro area) compared to the five other metros in Arizona.

**TABLE 1  
METROPOLITAN AREAS**

	<b>2014 GDP*</b>	<b>2014 Population</b>	<b>Share of State</b>	
			<b>GDP</b>	<b>Population</b>
<b>Arizona</b>	\$286,554	6,731,484		
Flagstaff	5,267	137,682	1.84%	2.05%
Lake Havasu City-Kingman	3,861	203,361	1.35	3.02
Phoenix-Mesa-Scottsdale	215,214	4,489,109	75.10	66.69
Prescott	4,810	218,844	1.68	3.25
Sierra Vista-Douglas	3,957	127,448	1.38	1.89
Tucson	35,717	1,004,516	12.46	14.92
Yuma	5,488	203,247	1.92	3.02
Balance of State	12,240	347,277	4.27	5.16
<b>Nevada</b>	135,038	2,839,099		
Carson City	2,918	54,522	2.16	1.92
Las Vegas-Henderson-Paradise	94,521	2,069,681	70.00	72.90
Reno	20,554	443,990	15.22	15.63
Balance of State	17,045	270,906	12.62	9.54

\* Gross domestic product in millions of dollars.

Source: U.S. Department of Commerce, Census Bureau (population) and U.S. Department of Commerce, Bureau of Economic Analysis (GDP), <http://www.bea.gov/regional/index.htm>.

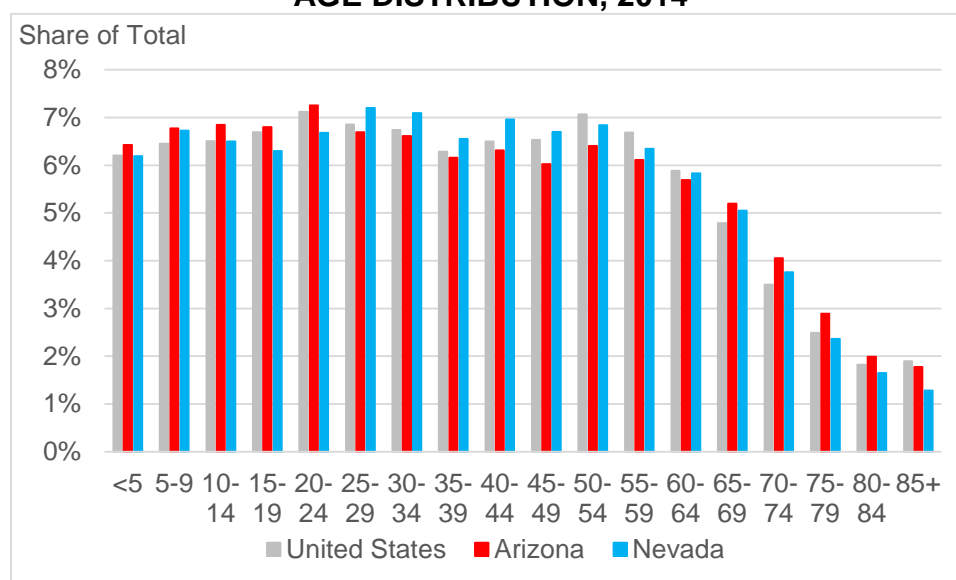
Nevada's population in 2014 was 42 percent of the Arizona total. The Las Vegas metro was 46 percent as populous as the Phoenix metro and the Reno metro's population was 44 percent of the Tucson metro area.

### Demographic Characteristics

The median age in 2014 of 37.4 years in Nevada was slightly greater than the Arizona figure of 36.9 and slightly less than the national average of 37.7.<sup>1</sup> The age distribution is displayed in Chart 1. Arizona's age distribution was not much different from the nation, but Arizona had somewhat higher-than-average shares in the 0-to-24 and 65-to-84 age groups and somewhat below-average shares in the 30-to-64 age group. Compared to Nevada, the age distribution in Arizona included higher shares in the 0-to-24 and 65-and-older age groups and lower shares among those 25-to-64 years old.

Nevada's child-dependency ratio — the number of residents younger than 18 divided by the number from 18-through-64 years of age — of 37.3 was nearly the same as the national figure of 37.0, and its old-age dependency ratio (the number of residents 65 and older divided by the number from 18-through-64 years of age) of 22.6 also was similar to the national figure of 23.2. Arizona was above average on each dependency ratio, with a child ratio of 40.2 and an old-age ratio of 26.5.

**CHART 1  
AGE DISTRIBUTION, 2014**



Source: U.S. Department of Commerce, Census Bureau, American Community Survey, Table S0101, <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.

<sup>1</sup> The source is the American Community Survey conducted by the U.S. Department of Commerce, Census Bureau.

The average household size (according to the 2010 census) of 2.63 in Arizona and 2.65 in Nevada was slightly higher than the average of 2.58 nationally. Nevada's higher average household size is not consistent with its fertility rate. In 2013 according to the National Center for Health Statistics, the total fertility rate — an estimate of the number of births that a hypothetical group of 1,000 women would have over their lifetimes, based on age-specific birth rates in a given year — was 1.86 in Nevada, equal to the national figure and less than the rate of 1.97 in Arizona.

In 2014, the racial/ethnic composition differed between Arizona and Nevada. Arizona had higher percentages of non-Hispanic whites (56.1 versus 51.3), Hispanics (30.5 versus 27.8), and non-Hispanic Native Americans (4.0 versus 0.9). The shares were lower in Arizona for non-Hispanic blacks (3.9 versus 8.2), non-Hispanic Asians (3.3 versus 8.3), and other non-Hispanics (2.2 versus 3.5). The percentage of residents who were foreign born was only marginally higher than the national figure of 13.3 in Arizona (13.7), but was considerably higher in Nevada (19.4).

### **Population Growth**

In every decade since the 1870s, numeric population change has been greater in Arizona than in Nevada. The population of Arizona surpassed Nevada during the 1880s. On a percentage basis, the states alternated having the faster growth through 1950. Since then, the percentage gains in Nevada have exceeded those in Arizona in each decade. From 1960 through 2010, Nevada had the greatest percent change in the nation in each decade, while Arizona ranked second or third in each of these decades.

Since World War II, the only year in which the numeric population gain in Nevada was greater than in Arizona was 1990. Since the early 1970s, the only years in which the percentage change in Nevada was less than in Arizona were 1983 through 1986 and 2010 and 2011.

Population change is highly cyclical in Arizona and Nevada, going up and down with the economic cycle. Each state experienced an unusually deep and long recession in the 2008-to-2010 period; population growth through 2015 remained below the norm of recent economic cycles in each state.

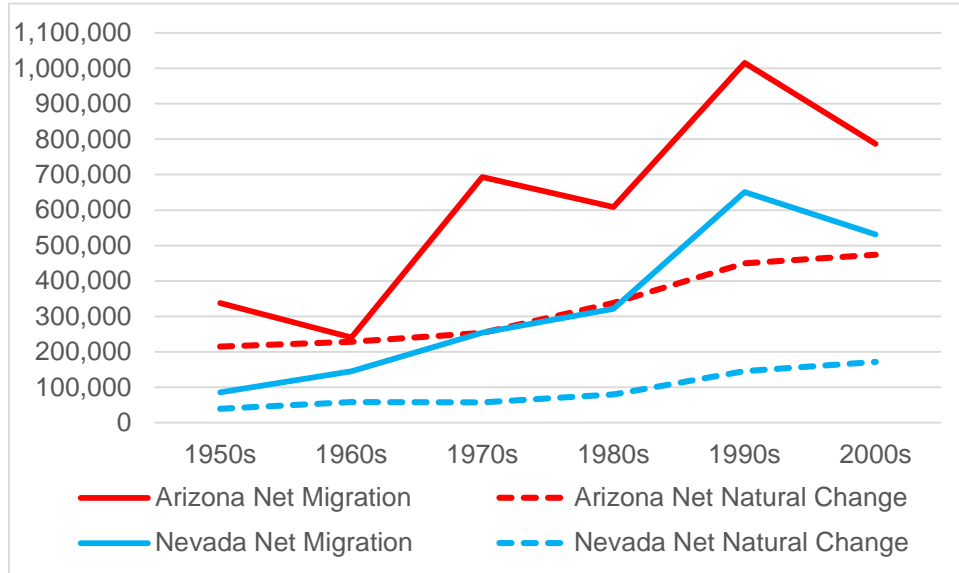
Net migration (from other states and from other countries) has accounted for the majority of the population increase in Arizona and Nevada. According to estimates of net migration by decade from the University of Wisconsin,<sup>2</sup> 65 percent of Arizona's population change between 1950 and 2010 was due to net migration; the proportion in Nevada was 78 percent. In each state, the share held relatively steady by decade. Net natural change and net migration by decade are shown in Chart 2 for Arizona and Nevada.

In each of the last six decades, net migration to Nevada expressed as a rate was much stronger than to Arizona among those in the 25-to-34 age group. More generally, the net migration rate was higher in Nevada in each age group under the age of 60. From the 1950s through the 1970s,

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<sup>2</sup> The estimates of net migration by decade were made by collecting data on births and deaths and subtracting the net natural change from the population change between decennial censuses. Net migration includes net domestic migration and net international migration. The estimates are available at <http://www.netmigration.wisc.edu/>.

**CHART 2**  
**NET MIGRATION AND NET NATURAL CHANGE BY DECADE**



Source: University of Wisconsin, Applied Population Laboratory, <http://www.netmigration.wisc.edu/>.

the net migration rate was higher in Arizona than in Nevada among those 60 and older. Since then, the net migration rates in the older age groups have been similar in Arizona and Nevada.

According to estimates from the U.S. Census Bureau, net migration was a lesser share of the population change in each state between 2010 and 2015, accounting for 59 percent of the population gain in Nevada and 55 percent in Arizona. Domestic net migration accounted for between 36-and-37 percent in each state, while the international share was 18 percent in Arizona and 22 percent in Nevada.

### **Legislative Cycle and State Government Budget**

In Arizona, the State Legislature meets in regular session annually, beginning in January. A budget for the next fiscal year is passed each regular session. Special sessions sometimes are called.

In Nevada, the Legislature meets in regular session only in odd-numbered years, beginning at the end of January. The regular session, during which a biennial budget is passed, is limited to 120 days. Special sessions are somewhat more common than in Arizona, largely because of the difficulty in conducting all business for a two-year period in four months. The last special session was in December 2015. The Nevada Legislature is not currently in session.

During the last economic recession, each state faced a very large budget deficit and was restricted in their response to the deficit by having a constitutional requirement for a two-thirds vote of the Legislature to pass a revenue increase. The states employed similar strategies to balance the budget, including significant spending reductions. One distinction, however, was that the Nevada Legislature passed a temporary revenue increase (affecting various taxes and fees)

during 2009, the first year of budget difficulties. Intended to last two years, these temporary measures were extended in 2011 and 2013. In Arizona, the Legislature did not pass a temporary revenue increase themselves, but referred a measure to the ballot in a special election in 2010. The temporary sales tax increase was passed by voters and remained in effect for three years.

Like Arizona, the Republican Party in Nevada currently holds the majority of the seats in each house of the legislature and the governor is a republican. Despite this, the two states took very different approaches to balancing the budget during the 2015 legislative session. In Arizona, due to a projected deficit (that did not materialize), the Legislature took a number of actions similar to those employed during the last recession, including spending reductions. The latter included a reduction of nearly \$100 million in the budget for the universities and the elimination of state funding for the largest community college districts.

In Nevada, the governor proposed a significant package of revenue increases. The proposal passed each legislative house by more than the two-thirds required. This package extended some of the temporary revenue increases and made others permanent. It also included a significant increase in cigarette taxes and increases in business taxes. In addition to raising business license fees, a modified gross receipts tax was created. Other states without a corporate income tax utilize gross receipts taxes. (Nevada also does not levy an individual income tax; revenues from gaming taxes and fees essentially substitute for the individual income tax.)

The proceeds from the governor's "Nevada Revenue Plan," which are expected to total \$1.1 billion, are intended to be used for elementary and secondary education, including all-day kindergarten, expansion of reading programs, more resources for English language learners, and reductions in class size. As part of the package, public support for children attending private schools is being expanded.

The funding increase for elementary and secondary education in Nevada is intended to be permanent. In contrast, Arizona also is planning for a funding increase for elementary and secondary education, but this is a temporary measure that will last only 10 years, and is subject to a public vote in a special election in May 2016. Most of the funding increase will come from the state's permanent fund (land trust), not from taxes. In addition, the portion of the sales tax that is dedicated to education expires in 2021 in Arizona.

## ECONOMIC DEVELOPMENT

Regional economies, such as state economies, are driven by economic activities that bring money into the region that would otherwise not be present, by selling goods and services to customers — individuals, companies, and governments — who are not residents of, or operate in, the region. Such activities have been variously labeled as “tradable,” “export,” “basic,” and “traded sector” — the latter term is used in this paper. Traded-sector activities are responsible for the prosperity and growth of each regional economy, but typically represent only about 30 percent of a region’s total economic activity.

Traded-sector activities fundamentally differ from “population-serving” activities, which sell to and support residents and businesses located within the region. While necessary to the functioning of a regional economy, population-serving activities respond to the growth occurring in traded-sector activities; they do not bring money into the regional economy. Their presence in the region is in response to the spending of businesses that sell goods and services to customers outside the region and to the spending of the employees of the traded-sector businesses. Population-serving activities would not exist if traded-sector activities were not present. Regional economic development focuses on traded-sector activities since other regions in the United States and other nations compete to become the home of these activities.

The importance of various economic development factors — also known as “location factors” or more generally as the “business climate” — is discussed in the November 2014 report, *Overview of Economic Competitiveness: Business and Individual Location Factors, With a Focus on Arizona*, <https://wpcarey.asu.edu/sites/default/files/uploads/center-competitiveness-and-prosperity-research/competitiveness11-14.pdf>. With the evolution of the American economy from the industrial age to the information age, the relative importance of the various business location factors also has evolved. In the past, cost factors, including the tax burden, were more significant than they are now. While costs — particularly labor costs — remain on the list of important location factors, two other factors are now rated as more significant to traded-sector companies:

- The quality and availability of the labor force. Educational attainment and achievement are key aspects of labor force quality. Job training programs also contribute.
- The quality and availability of the physical infrastructure, including the transportation system, utilities, and telecommunications.

The relative importance of location factors varies by the type of economic activity. For companies with a focus on technology and innovation, labor force issues are of particular significance, with cost factors relatively less important.

While public policy has little, if any, effect on some of the location factors, such as labor costs and real estate costs, the availability and quality of the educational system and some parts of the physical infrastructure are heavily dependent upon the public sector. In particular, funding of the public educational system and of the transportation infrastructure play key roles in economic development.

Following a summary of studies evaluating the business climate, the major economic development factors of education and the physical infrastructure are examined. Other factors, including measures related to technology and innovation, are then addressed.

### **Evaluations of Business Climate**

Various studies address competitiveness or the “best place to do business” at the level of U.S. states. The ratings of competitiveness by state vary considerably across the studies. Because of this variation, it is important to evaluate the strengths and weaknesses of each study to determine which ratings are most reliable. Each of the studies of competitiveness by state appears to have significant limitations. The studies by the Beacon Hill Institute and *Forbes* magazine appear to be the best. The results from these studies are significantly correlated to prosperity, as measured by per capita gross domestic product and per capita personal income.

The latest versions of these two studies are consistent in their evaluation of competitiveness in Arizona and Nevada. Arizona ranks 23rd nationally and seventh among 10 western states in both studies. Nevada ranks 34th nationally and ninth among the western states in both studies.

### **Labor Force (Education)**

Elementary and secondary education and higher education are important aspects of the quality and availability of the labor force. Output measures such as educational achievement and attainment are discussed in this subsection. Funding — a key input into the educational system — is examined in the next section.

#### **Test Scores**

The National Assessment of Educational Progress (NAEP), also known as the “Nation’s Report Card,” is the largest nationally representative and continuing assessment of student achievement. Tests are conducted periodically in various subjects, particularly reading and mathematics, and are primarily given to fourth- and eighth-graders. Since only a small portion of students take this test, sampling error can be an issue at the state level. Results are available from the U.S. Department of Education’s National Center for Education Statistics (NCES) at <http://www.nationsreportcard.gov/>.

Between 1992 and 2015, the fourth-grade reading test was administered 11 times in Arizona and nine times in Nevada. Each time, the scores in Arizona and Nevada were significantly lower than the national average. The scores in Arizona and Nevada were similar. The eighth-grade reading test was administered nine times between 1998 and 2015 in both Arizona and Nevada. Each time, the scores of Nevada’s students were significantly lower than the national average; Arizona was significantly below average except in 1998 and 2015. In eight of the nine tests, the score in Arizona was higher than in Nevada.

Between 1992 and 2015, the fourth-grade mathematics test was administered 10 times in Arizona and nine times in Nevada. The scores were significantly lower than the national average each time in Nevada and all but once in Arizona. Generally, the scores in Arizona and Nevada have been comparable. The eighth-grade mathematics test was administered 11 times between 1990 and 2015 in Arizona; the test was given eight times in Nevada. Each time, the scores of Nevada’s students were significantly lower than the national average. Arizona’s score was significantly below average all six times from 2003 through 2013, but was slightly above average in 2015. Scores in Arizona were consistently higher than those in Nevada.



The eighth-grade science test was administered in 2009 and 2011 in Arizona and Nevada. Each time, the states had identical scores, significantly below the national average. The only time fourth graders were given the science test, both states scored significantly below average; the score for Arizona was a little lower than for Nevada. The writing test has not been administered since 2007, but each time it was given, Arizona and Nevada scored significantly below average.

Student achievement is affected by a number of conditions, including household income, whether English is a child's first language, and the educational attainment of a child's parents. Since these factors are correlated to race/ethnicity, significant variations in test scores are seen across racial/ethnic groups. Some of the NAEP test results are cross-tabulated by these characteristics by the NCES. However, test scores are not available for all categories, especially in Nevada, because of the small sample size in some groups.

Nationally, English language learners scored far below other students on the reading test in 2013, in both the fourth grade and the eighth grade; the scores in Arizona and Nevada were below the national average. The reading scores of other students were significantly below average in Arizona and Nevada, with Arizona's scores lower than those in Nevada.

Nationally by race/ethnicity, non-Hispanic whites and Asians scored much higher than other groups on the fourth-grade reading, eighth-grade math, and eighth-grade science tests. Asians scored higher than whites on reading and math.

There was a direct and significant relationship between the educational attainment of parents and the test scores of children on the eighth-grade math test in 2013. Those students whose parents had attended college, and especially those with parents earning a bachelor's degree, scored much higher than others. Scores by the educational attainment of parents were comparable to the national average in Arizona and Nevada. This indicates that the lower overall test scores in these states largely are due to the parents of children being less well educated (as discussed in the next subsection), along with associated socioeconomic factors.

### **Educational Attainment**

Data on educational attainment come from the American Community Survey (ACS) produced by the U.S. Census Bureau. In order to reduce sampling error, data for the five years from 2010 through 2014 are used in this subsection.

Most commonly, the Census Bureau expresses educational attainment for the population aged 25 and older. Educational attainment often is measured as either the percentage with at least a high school diploma or the percentage with at least a bachelor's degree. On the former measure, Arizona's attainment over the 2010-to-2014 period was nearly equal to the national average, while Nevada was slightly below average. In both Arizona and Nevada, a disproportionate share of residents 25 and older had some college but no degree as their maximum attainment. The share with an associate's degree was marginally above average in Arizona and slightly below average in Nevada. However, on the bachelor's degree-or-more measure, Arizona was below the national average and Nevada was further below average (see Table 2).

Educational attainment is an important indicator of the quality of the labor force, but is not a direct measure of the quality of a state's educational system since so many residents have migrated from one state to another state, or immigrated from another country. Those born and living in the same state likely were educated in that state (through grade 12). While many of those who moved to a state were educated elsewhere, some may have moved as a child and been educated in the state in which they are living.

Among those living in the same state in which they were born during the 2010-to-2014 period, educational attainment in Arizona and Nevada was below the national average. Each state had an above-average share of those with some college or an associate's degree but had below-average shares with bachelor's degrees and graduate degrees. Attainment was similar in Arizona and Nevada except that Arizona had a higher share not graduating from high school.

Nationally and in Arizona and Nevada, those who had migrated from another state were considerably better educated than those who had not made an interstate move. Interstate migrants

**TABLE 2**  
**PERCENTAGE WITH AT LEAST A BACHELOR'S DEGREE, 2010-14 AVERAGE**

	<b>United States</b>	<b>Arizona</b>	<b>Nevada</b>
<b>Age 25 and Older Total</b>	29.3%	27.1%	22.5%
Age 18 to 24	9.6	6.7	5.3
Age 25 to 34	32.4	25.6	21.6
Age 35 to 44	32.8	28.8	22.3
Age 45 to 64	29.1	27.5	23.2
Age 65 and Older	23.2	26.2	22.5
Born in Same State	24.7	19.6	20.0
Born in Different State	37.0	31.9	24.3
U.S. Citizen Born Outside the United States	28.1	31.2	24.2
Foreign Born	28.0	19.8	18.8
Living in Poverty	11.1	10.6	10.8
Not Living in Poverty	32.2	30.2	24.4
Non-Hispanic White	32.7	33.0	26.6
Black	19.0	22.3	16.3
Hispanic	13.9	11.0	8.6
Asian	50.9	51.0	36.6
Native American	13.6	9.6	10.6
<b>Age 25 to 64 Total</b>	30.9	27.3	22.6
Employed	35.5	31.9	25.5
Unemployed	18.4	15.4	13.4
Not in Labor Force	19.3	18.1	16.4

Source: U.S. Department of Commerce, Census Bureau, American Community Survey, Tables S1501, B06009, B15002, B17003, and B23006, <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.

to Arizona were not as well educated as the national average of interstate migrants, but Arizona's interstate migrants were better educated than those of Nevada, as seen in Table 2.

Nationally, the educational attainment of the foreign-born population was considerably different from that of the rest of the population. A much greater share of the foreign-born had not graduated from high school, but the share with a graduate degree was a little above average. Relative to the national average, the foreign-born population in Arizona and Nevada were less well educated. Relative to Nevada, Arizona had a larger share of those who had not graduated from high school but also a greater share of those with a graduate degree.

Among the racial/ethnic groups nationally, educational attainment was highest among Asians, though the percentage of Asians who had not graduated from high school was higher than the share of non-Hispanic whites. The educational attainments of blacks, Native Americans, and especially Hispanics were considerably lower than the attainments of Asians and non-Hispanic whites.

In Arizona, the educational attainment of non-Hispanic whites, blacks, and Asians was above the national average of each of these racial groups, with a greater percentage with some college/associate's degree and a lesser share with less attainment. However, the attainment of Hispanics and Native Americans was below average, with lesser shares with a bachelor's degree or more. Thus, Arizona's overall below-average educational attainment among those 25 and older resulted from a combination of below-average attainment among Hispanics and Native Americans and a disproportionate share of the population being Hispanic or Native American.

In Nevada, educational attainment was below the national average in each of the racial/ethnic groups. Compared to Arizona, Nevada had greater attainment among Native Americans, but lesser attainment in each of the other racial/ethnic groups.

As with the educational achievement measures, educational attainment is correlated to various socioeconomic factors; attainment is much lower among those living in poverty. The poverty level varies with household size, rising by \$4,160 per person from the \$11,770 figure for a single person. For example, a family of three earning \$25,000 is not classified as living in poverty, while a family of five with the same earnings is designated as living below the poverty level. Arizona's below-average educational attainment is seen in both groups: those living in poverty and those not. In contrast, Nevada's lower overall educational attainment is concentrated among those not living in poverty.

Educational attainment also varies by age. Nationally, attainment in the 2010-to-2014 period was highest among those 25-to-44 years old and declined with age among those older than 44. Arizona's below-average educational attainment was greatest in the 25-to-34 age group. The attainment of those 65 and older was above average. In Nevada, educational attainment was considerably below average among those less than 45; the attainment of those 65 and older was similar to the U.S. average. Attainment in Arizona was higher than in Nevada in each age group.

Thus, in both Arizona and Nevada, the standard presentation of educational attainment for those 25 and older overrates educational attainment in terms of economic development purposes. The

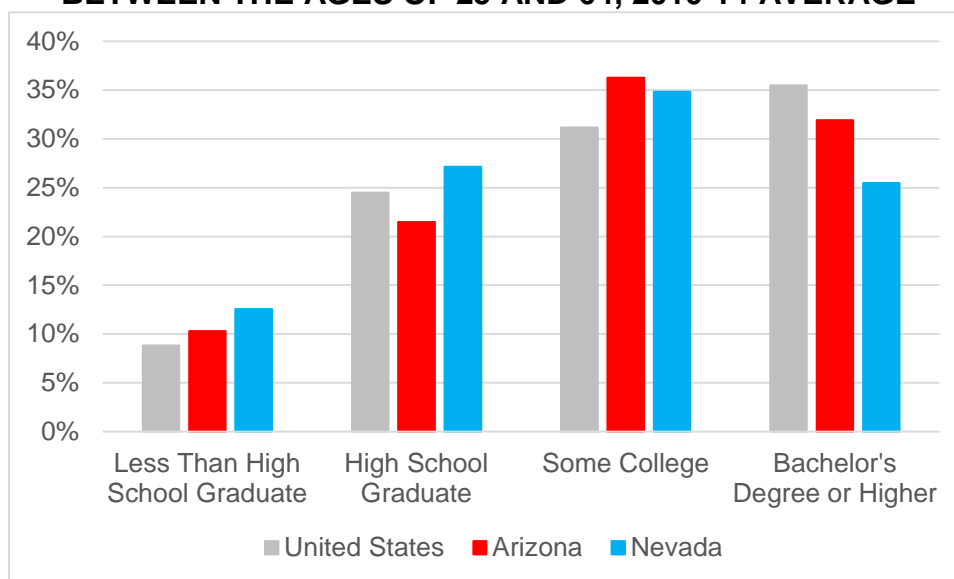
Census Bureau produces a table of those from 25-to-64 years of age, subdivided by those employed in civilian jobs, those unemployed, those in the armed forces, and those not in the workforce. The educational attainment of those employed in the 2010-to-2014 period was considerably higher than the attainment of those unemployed and of those not in the labor force, nationally and in Arizona and Nevada, though the differentials were not as great in Nevada.

Among those employed, the educational attainment in Arizona and especially in Nevada was inferior to the national average during the 2010-to-2014 period, as seen in Chart 3. In each state, a disproportionately high share of workers had not graduated from high school and a below-average share had earned at least a bachelor's degree.

Median earnings vary directly with educational attainment. Of those 25 and older with earnings (including those working part time), the overall median nationally was \$36,034. The median ranged from \$19,954 among those who had not graduated from high school to \$66,944 among those with a graduate degree.

The overall median earnings figures in Arizona and Nevada were less than the national average. After adjusting for the cost of living,<sup>3</sup> Arizona's figure was 2.5 percent less than the national average, while Nevada's figure was 5.8 percent below average. In Arizona, the adjusted median in the some college/associate's degree category was a little above the national average, while adjusted median earnings were below the national average in each of the other educational

**CHART 3**  
**EDUCATIONAL ATTAINMENT OF WORKERS**  
**BETWEEN THE AGES OF 25 AND 64, 2010-14 AVERAGE**



Source: U.S. Department of Commerce, Census Bureau, American Community Survey, Table B23006, <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.

<sup>3</sup> Living costs come from the U.S. Department of Commerce, Bureau of Economic Analysis, <http://www.bea.gov/regional/index.htm>. These figures are discussed in the Education Funding section.

attainment categories, especially graduate degrees. In contrast, adjusted median earnings in Nevada was well above the national average for those with who had not graduated from high school and also was above average for those with high school diplomas and those with some college/associate's degree, but was below average for those with more educational attainment.

### **Other Educational Measures**

The NCES provides considerable data on elementary and secondary (K-12) education. Consistent with the much lesser funding per K-12 student in Arizona and Nevada discussed in the following Education Funding section, the pupil-teacher ratio is considerably higher than the national average in these states. In fall 2012, the figure was 22.3 in Arizona and 21.5 in Nevada, compared to the national average of 16.0. The differential between Arizona and the nation has grown over time. An alternative measure of average classroom size in the 2011-12 school year indicated that the figures in elementary schools were 24.1 in Arizona, 25.3 in Nevada, and 21.2 nationally. In secondary schools, the figures were 27.7 in Arizona, 34.5 in Nevada, and 26.8 nationally.

Teachers in Arizona and Nevada on average have fewer years of classroom experience than the national average. Nationally, 42 percent of teachers had fewer than 10 years of experience in 2012, compared to 54 percent in Arizona and 45 percent in Nevada. Arizona's teachers also had lesser educational attainment, with 51 percent having earned at least a master's degree compared to 56 percent nationally. Nevada was considerably above average on this measure.

Consistent with teachers in Arizona having fewer years of experience and less educational attainment, the average teacher's salary in Arizona has been less than the national average over the last several decades, with a difference of 10 percent in the 2013-14 school year. The average in Nevada has fluctuated around the national average, consistent with its teachers being more highly educated but less experienced than average. However, a table of the average base salary of teachers with a bachelor's degree, subdivided by the number of years of experience, indicates that salaries in Arizona in 2011-12 were considerably below the national average in each category of teacher experience. In contrast, Nevada's salaries were close to the national average.

Various difficulties compromise the accuracy of reported high school graduation rates. Thus, the reported percentages of high school students graduating with a regular high school diploma in four years shown in Table 3 need to be interpreted cautiously.

Another statistic often examined is college entrance test scores. However, these scores are greatly affected by the percentage of high school students taking the entrance tests. The percentage is considerably lower in Arizona than in Nevada or the national average. Thus, the apparently higher test scores in Arizona should be discounted. Scholastic Aptitude Test scores in Nevada have been slightly below the national average for reading but considerably below average for writing and mathematics.

**TABLE 3**  
**HIGH SCHOOL GRADUATION RATES AT PUBLIC SCHOOLS**

		<b>United States</b>	<b>Arizona</b>	<b>Nevada</b>
2011	Total	79%	78%	62%
2012	Total	80	76	63
2013	Total	81	75	71
	White	87	83	77
	Black	71	70	57
	Hispanic	75	69	64
	Asian	89	84	81
	Native American	70	61	59
	Economically Disadvantaged	73	69	64
	Limited English Proficiency	61	20	24
	Students With Disabilities	62	63	26

Note: Graduation is defined as a regular diploma in four years.

Source: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics*, Table 219.46, [http://nces.ed.gov/programs/digest/2014menu\\_tables.asp](http://nces.ed.gov/programs/digest/2014menu_tables.asp).

### **Infrastructure**

The American Society of Civil Engineers (ASCE) has issued report cards on the status of the physical infrastructure for 36 states over the last several years (<http://www.infrastructurereportcard.org/>). A national report card also is produced by the ASCE, providing a grade for each of 16 categories. None of the states evaluate all 16 categories and some states report on additional categories. An overall grade is reported by state, but since the components of the infrastructure that are examined vary by state, the overall grade is not directly comparable from one state to another.

The latest grades for the nation, Arizona and Nevada are shown in Table 4 by category, along with the median grade of those states evaluating each category. In most categories, the national grade is lower than the median grade of the states. Of the six categories evaluated in both Arizona and Nevada, the grades generally are similar. Arizona is appraised more favorably for aviation, while Nevada is evaluated more highly for wastewater.

In the categories reported in the Arizona study, Arizona generally is at or above the median of the states. The exception is roads. In Nevada, grades typically are close to those of the median state, though Nevada scores higher for wastewater.

State and local governments have a limited role in providing some types of infrastructure, such as railroad transportation and energy production. Other parts of the physical infrastructure are largely provided by the public sector, including roads and public schools.

**TABLE 4  
INFRASTRUCTURE GRADES**

	United States	Median State	Number*	Arizona	Nevada
Overall**	D+	C-	35	C	C+
Transportation:					
Aviation	D	C	27	B-	C-
Bridges	C+	C-	28	B	
Inland Waterways	D-	D+	11		
Ports	C	C+	6		
Rail	C+	C	21	C+	
Roads***	D	C-	36	D+	C-
Transit	D	D+	23	C+	
Waste:					
Solid Waste	B-	B-	19		B-
Hazardous Waste	D	C+	3		
Water Related:					
Canals		C-	2		
Dams	D	C-	30	C-	D+
Drinking Water	D	C-	29	C-	C-
Levees^	D-	D+	15	C-	C-
Wastewater	D	C-	34	C	B
Other:					
Energy	D+	C+	18		
Parks & Recreation	C-	C+	8		
Schools	D	C-	19		D

Note: A blank indicates that no evaluation was made in that category.

\* Number of states producing an evaluation.

\*\* The overall grades should not be compared due to the varying components of the infrastructure examined by state.

\*\*\* This category is labeled as 'transportation' in Nevada and includes transit as well as roads.

^ This category is labeled as 'flood control' in Nevada.

Source: American Society of Civil Engineers, <http://www.infrastructurereportcard.org/>.

The Census Bureau reports the capital outlays of state and local governments by state, overall and for some types of spending.<sup>4</sup> The latest data are for fiscal year (FY) 2013. In that year, Arizona's total capital outlays relative to personal income were 3 percent below the national average. Nevada's outlays were 9 percent below the U.S. average. Relative to the national average, Arizona spent more relative to personal income for higher education, less for K-12 education and highways, and about the same for other types of capital outlays. Nevada's outlay per \$1,000 of personal income was considerably below the national average for K-12 and higher education, but was a little above average for highways and other capital outlays.

Capital outlays can vary considerably from year to year. After smoothing out the fluctuations, Arizona's capital outlays relative to personal income have declined over time. Capital

<sup>4</sup> U.S. Department of Commerce, Census Bureau, State and Local Government Finance, <http://www.census.gov/govs/>.

expenditures in Nevada also have trended down but have been more erratic, with the FY 2013 figure far below the figures of the prior two decades, relative to personal income.

Looking at the totals for FYs 1992 through 2013 relative to personal income, total capital outlays in Arizona and Nevada were above the national average, by 18 percent in Arizona and 35 percent in Nevada. Capital outlays relative to personal income typically are higher in states with rapid population growth. In addition, capital outlays for highways are higher in geographically large states with a low population density. Cumulative capital spending relative to personal income was greater in Nevada than in Arizona overall (by 15 percent), for highways (by 40 percent), and for purposes other than highways and education (by 15 percent). Nevada's capital spending for higher education was 35 percent less than in Arizona; capital spending for K-12 education was nearly identical in the two states.

### **Other Economic Development Factors**

Other than the quality and availability of the labor force and the quality and availability of the physical infrastructure, various costs constitute the next-most important business location factor. The cost of labor is the most significant of the cost factors, with taxes, real estate prices, and energy costs among the other cost factors relevant to economic development. Public policy has little effect on most of the costs, with the exception of taxes.

In order to attract and retain workers, a company must consider location factors important to individuals as well as the factors important to the business. Employment opportunities and wages are the most important considerations for those in the workforce. The quality of life — better described as the “quality of place” — is important to individuals. It has many aspects, such as the cost of living, crime, and cultural and recreational opportunities. Fiscal factors also are considered by individuals — the level of personal taxes relative to the availability and quality of public services, including the transportation system and the education system.

While the relative importance of location factors vary between businesses and individuals, most factors are relevant to both groups and are viewed similarly. For example, a strong transportation infrastructure is evaluated positively by each group. Wages/labor costs are the primary factor viewed inconsistently by the two groups.

### **Tax Burden**

Taxes are not of particular significance as a component of regional economic competitiveness, especially to innovative and productive traded-sector companies. While federal taxes can be a significant cost, state and local taxes are of much lesser magnitude. Taxes are evaluated by both businesses and individuals relative to the quality and availability of valued public services. However, taxes receive disproportionate attention by the media and in most studies of regional economic competitiveness.

Tax burdens are somewhat correlated to aggregate economic growth rates, but are not correlated to either the level or the growth rate of productivity and prosperity measures. However, the correlation between taxes and aggregate growth does not indicate that low taxes are causing the faster growth. Most fast-growing states are in the South or West, where climate or other factors may be the root cause of the faster growth. Rather than prompting faster growth, tax reductions



often have occurred in response to strong economic growth, which creates a surplus in public-sector budgets.

While many studies have been released that compare tax burdens across states or other geographic areas, most are unreliable due to methodological and data shortcomings. Even the methodologically strong studies reviewed below may be misleading due to misreporting of data by state and local governments.

**Total Taxes.** A measure of the overall tax burden — including taxes paid by individuals and businesses — can be calculated from data reported annually by the Census Bureau in its State and Local Government Finance series (<http://www.census.gov/govs/local/>). The latest data are for fiscal year 2013. To compare areas, the Census Bureau's data can be expressed either per capita or per \$1,000 of personal income.

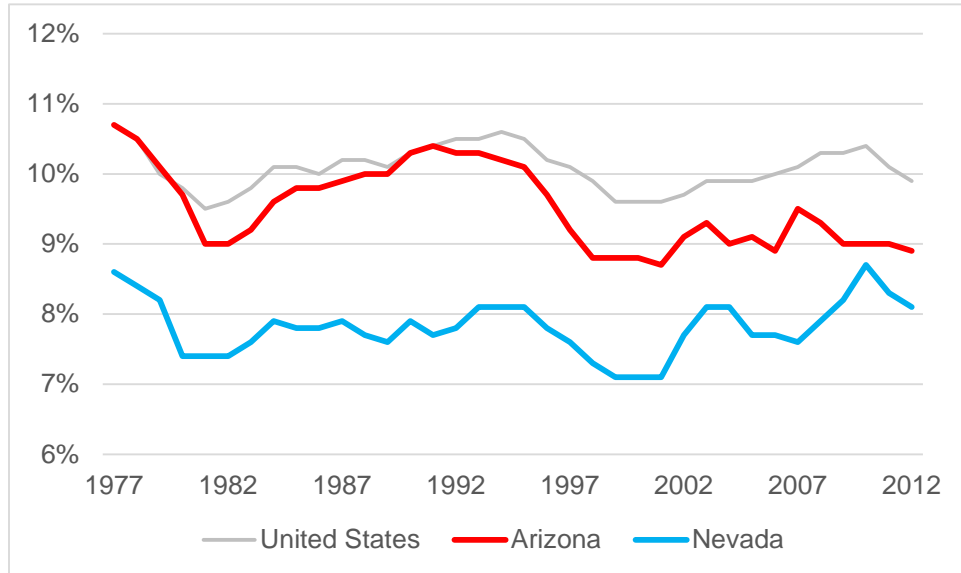
On a per capita basis, the overall state and local government tax burden in Arizona in FY 2013 was 26 percent less than the national average; the state ranked 44th among the 50 states and the District of Columbia, where a rank of first represents the highest taxes. The tax burden was higher in Nevada — despite Nevada not employing either an individual or corporate income tax — at 15 percent below average, ranking 29th. Since per capita personal income is considerably below the national average in both Arizona and Nevada, the tax burden is higher per \$1,000 of personal income. Arizona was 10 percent below average, ranking 38th, and Nevada was 5 percent below average, ranking 30th on taxes paid per \$1,000 of personal income.

On a per capita basis, the general sales tax burden in Arizona was considerably above the national average (the temporary increase in the sales tax rate from June 2010 through May 2013 is reflected in these figures). The burden of nearly every other tax was substantially below average in Arizona. In Nevada, the per capita general sales tax burden was even a little higher than in Arizona. Nevada also was above the national average, and far above Arizona, in the selective sales tax category and the other tax category, mostly related to gaming taxes. Relative to Arizona, the per capita property tax collection was slightly lower in Nevada while the per capita motor vehicle license tax was twice as high.

The Tax Foundation provides a comparison of total state and local government taxes by state from 1977 through 2012 using a methodology different from that of the Census Bureau in its “Annual State-Local Tax Burden Ranking” (<http://taxfoundation.org/article/state-local-tax-burden-rankings-fy-2012>). A key difference in the Tax Foundation's methodology is that it distinguishes between local residents and others who pay state and local government taxes in a particular state. For example, since gaming taxes are a significant source of revenue in Nevada and since most of these taxes are paid by nonresidents, the residents of Nevada have a lower tax burden than would be concluded from using the Census Bureau's data.

According to the Tax Foundation, the state and local government tax burden has fluctuated over time nationally (see Chart 4). Arizona's tax burden was below the national average from 1992 through 2012, with a large differential from 1997 through 2012. The tax burden paid by Nevada residents has consistently been lower than in Arizona, though the differential was smaller from 2009 through 2012 than in earlier years. In 2012, Arizona ranked 36th and Nevada 43rd among

**CHART 4**  
**STATE AND LOCAL GOVERNMENT TAX BURDEN:**  
**PER CAPITA TAXES PAID AS A PERCENTAGE OF PER CAPITA INCOME**



Source: Tax Foundation, “Annual State-Local Tax Burden Ranking,” <http://taxfoundation.org/article/state-local-tax-burden-rankings-fy-2012>.

the states. Arizona’s rank was slightly higher than the rank from the Census Bureau’s data, while Nevada’s rank was considerably lower.

**Individual Taxes.** An annual study of state and local government taxes paid by individuals is produced by the government of the District of Columbia. Its methodology differs from that of the other tax studies. For a hypothetical family of three living in the largest city in each state and the District of Columbia, the amount of state and local government taxes paid are calculated based on the applicable tax laws for four types of taxes at each of five income levels, ranging from \$25,000 to \$150,000.

Phoenix and Las Vegas are compared to the median of the 51 cities in Table 5. The total of the four types of taxes in 2014 was considerably higher in Phoenix than in Las Vegas except at the lowest income level. Except at the \$25,000 income level, the individual tax burden at each income level was below the median of the 51 cities in both Phoenix and Las Vegas, with the differential largest at the two highest income levels.

In Las Vegas and especially in Phoenix, the sales tax burden was considerably above the median of the cities. This was offset by an income tax burden far below the median in Phoenix and no income tax in Las Vegas. As a percentage of income, the tax burden is highest at the \$25,000 income level nationally and in Phoenix and Las Vegas. Nationally, there is slight progressivity between the \$50,000 and \$150,000 levels, but the tax structure is regressive in Las Vegas and flat in Phoenix.

**TABLE 5**  
**STATE AND LOCAL GOVERNMENT TAXES PAID BY INDIVIDUALS IN 2014**  
**AS A PERCENTAGE OF THE MEDIAN OF 51 CITIES**

	Household Income				
	\$25,000	\$50,000	\$75,000	\$100,000	\$150,000
Total:					
Phoenix	103.0%	94.8%	90.9%	85.2%	86.6%
Las Vegas	104.3	74.0	67.2	59.8	58.1
Income Tax:					
Phoenix	*	45.5	44.1	46.1	48.4
Las Vegas	-	-	-	-	-
Property Tax:					
Phoenix	94.8	111.1	110.9	108.6	100.6
Las Vegas	104.2	100.0	99.9	97.7	90.5
Sales Tax:					
Phoenix	131.6	132.6	133.5	131.8	135.8
Las Vegas	117.6	120.9	119.9	120.9	122.6
Automotive Taxes:					
Phoenix	101.8	105.1	130.2	113.7	185.4
Las Vegas	121.2	123.4	128.5	122.4	201.0

\* Income tax payments at this income level are near zero.

Source: Government of the District of Columbia, *Tax Rates and Tax Burdens in the District of Columbia — A Nationwide Comparison, 2014*, <http://cfo.dc.gov/node/215912>.

**Business Taxes.** The latest annual study of “Total State and Local Business Taxes,” produced by Ernst & Young for the Council on State Taxation, is for fiscal year 2014 (<http://www.cost.org/WorkArea/DownloadAsset.aspx?id=91531>). This study is limited to tax payments made by businesses. The amount of effort and sophistication in the Ernst & Young study greatly exceeds that of other business tax studies.

Unlike the Tax Foundation study, all taxes paid by businesses are included in the Ernst & Young study, organized into six categories of business taxes: property, sales, excise, income (which includes corporate and individual, the latter for unincorporated businesses filing on the individual return), unemployment insurance, and license and other taxes, such as severance taxes. The amount of taxes paid by businesses during fiscal year 2014 was determined through a combination of detailed data collection and modeling. The total amount of taxes paid is divided by private-sector gross domestic product, with the result called the total effective business tax rate (TEBTR).

Ernst & Young warns that the TEBTR is only a starting point and is not sufficient to assess competitiveness:

- The TEBTR measures the average tax burden of existing businesses, not the marginal tax that would be borne by a company investing in a new facility.
- TEBTRs do not indicate economic incidence — the ability to pass the tax to consumers outside the state. This is of particular importance to severance taxes in states with oil reserves.

- Two states with equal TEBTRs may vary in their taxation by industry. For example, one state may have high taxes on capital-intensive manufacturers and low taxes on labor-intensive service industries.
- A state with a below-average TEBTR that derives most of its business tax revenue from origin taxes — such as property and sales — may not be as competitive as a state with a higher TEBTR that relies on taxes that have a larger impact on out-of-state businesses.

Arizona and Nevada are compared to the national average in Table 6. The overall business tax burden in FY 2014 was higher in Nevada than in Arizona, despite Nevada not levying an income tax. The sales tax burden in both states was considerably above the national average. In Arizona, the property tax was the only other tax that was greater than the U.S. average; the tax burden otherwise was far below average. The property tax burden was below average in Nevada, but Nevada's tax burden was considerably above average for excise taxes, the unemployment insurance tax, and license and other taxes.

On average, businesses pay a disproportionate share of the state and local government taxes collected in Arizona and Nevada — 51 percent in Arizona and 53 percent in Nevada versus 45 percent nationally. The actual tax burden varies by company. In Arizona, very small unincorporated businesses generally pay relatively little in taxes relative to counterparts in other states, in part because they pay income taxes based on the very low individual rates rather than the corporate rates, and in part since they typically own limited amounts of property and therefore are not as subject to the state's high business property taxes. In contrast, large industrial companies that own considerable property — which make up a large share of Arizona's traded-sector economy — pay a high amount in state and local taxes relative to counterparts in other states. These businesses pay a relatively high price for their consumption of public services and physical infrastructure, while the smallest businesses and individuals pay relatively little for their consumption of public services and physical infrastructure.

**TABLE 6**  
**STATE AND LOCAL GOVERNMENT TAXES PAID BY BUSINESSES**  
**IN FISCAL YEAR 2014**

	<b>Total Effective Business Tax Rate as a Percentage of the U.S. Average</b>		<b>Share of Business Taxes</b>	
	<b>Arizona</b>	<b>Nevada</b>	<b>Arizona</b>	<b>Nevada</b>
TOTAL	104.7%	114.6%	100.0%	100.0%
Property Tax	121.8	76.5	42.8	24.4
Sales Tax	162.9	178.4	32.5	32.1
Excise Taxes	80.7	136.8	8.9	14.8
Income Tax	55.2	0.0	7.6	0.0
Unemployment Insurance Tax	51.5	157.6	3.8	9.2
License and Other Taxes	47.7	236.4	4.4	19.4

Source: Ernst & Young, *Total State and Local Business Taxes: State-by-State Estimates for Fiscal Year 2014*, <http://www.cost.org/WorkArea/DownloadAsset.aspx?id=91531>.

The Ernst & Young study also provides estimates of business taxes per dollar of government expenditures that benefit businesses. Business taxes in Arizona and Nevada were about average relative to the services businesses receive. Thus, despite a low overall tax burden in each state, Arizona and Nevada did not compare favorably on the location factor of the amount of business taxes paid relative to the public services and infrastructure used by businesses.

Business tax cuts currently being phased in will improve Arizona's position, probably dropping Arizona's TEBTR to slightly below average. However, business property and sales tax payments will still be quite high. In contrast, business tax increases passed by the Nevada Legislature in 2015 will raise Nevada's business tax burden.

### **High Technology and Innovation**

Three indicators of human capital and three measures of financial capital that are related to technology have been selected for comparison. The economic literature on regional economic growth stresses the importance of high-quality human capital in the workforce. In order for smaller companies to grow, financial capital must be available.

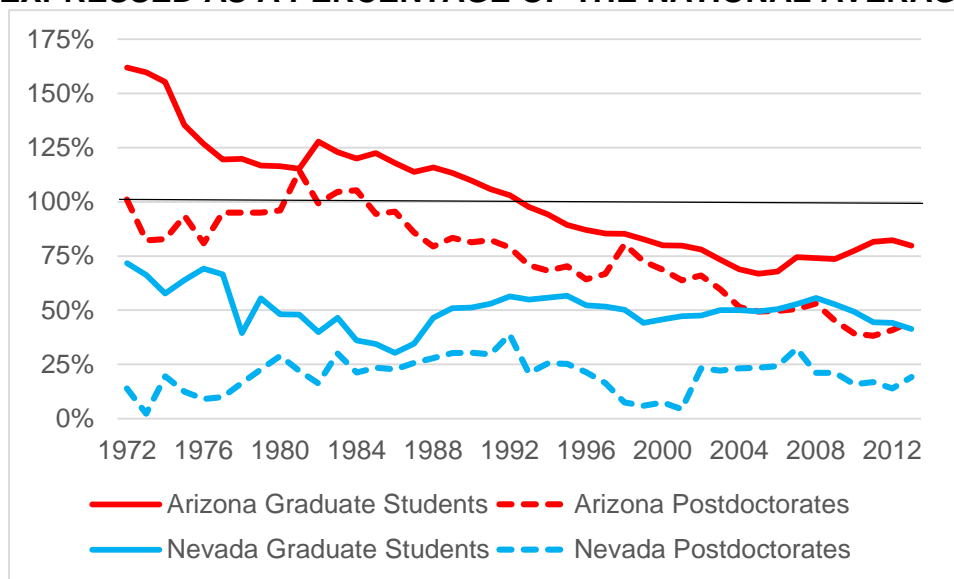
**Human Capital.** Graduate education at a state's universities is a source of high-quality human capital. Science and engineering specialties are of particular importance to innovation. The first indicator, which is expressed on a per capita basis, consists of two parts: the number of graduate students enrolled in, and the number of postdoctoral appointees in, science, engineering and health disciplines at doctorate-granting institutions. Annual data dating back to 1972 are available from the National Science Foundation (NSF).

Arizona was far above the U.S. average on the per capita number of graduate students in science and engineering during the 1970s, but the per capita number has declined relative to the nation since then (see Chart 5). Arizona has been below the national average since the early 1990s; the differential was 20 percent in 2013. Nevada's per capita number has been substantially below average throughout the time period, with a difference of 59 percent in 2013.

The per capita number of science and engineering postdoctorates was near the national average in Arizona through the mid-1980s, but since then the number has slipped relative to the national average. In 2013, Arizona was 55 percent below the U.S. average. Nevada has consistently been far below the national average; in 2013 the difference was 81 percent.

Advanced degrees in science and engineering are of particular importance to innovation. The second human capital indicator is the number of employed individuals holding a doctorate in a science, engineering or health field, expressed on a per capita basis. Occasional data dating back to 1993 are available from the National Science Foundation. This indicator is subdivided into those working in a science/engineering occupation and those working in other jobs. The per capita figures in Arizona and Nevada have been below the national average throughout the time period, overall and in each of the subcategories. Each state has experienced a decline over time relative to the nation in the per capita number working in science and engineering occupations. Arizona's figures have been consistently greater than those in Nevada. Overall in 2013 relative to the national average, Arizona's figure was 34 percent less and Nevada's figure was 59 percent less.

**CHART 5**  
**PER CAPITA NUMBER OF GRADUATE STUDENTS**  
**AND POSTDOCTORATES IN SCIENCE AND ENGINEERING,**  
**EXPRESSED AS A PERCENTAGE OF THE NATIONAL AVERAGE**



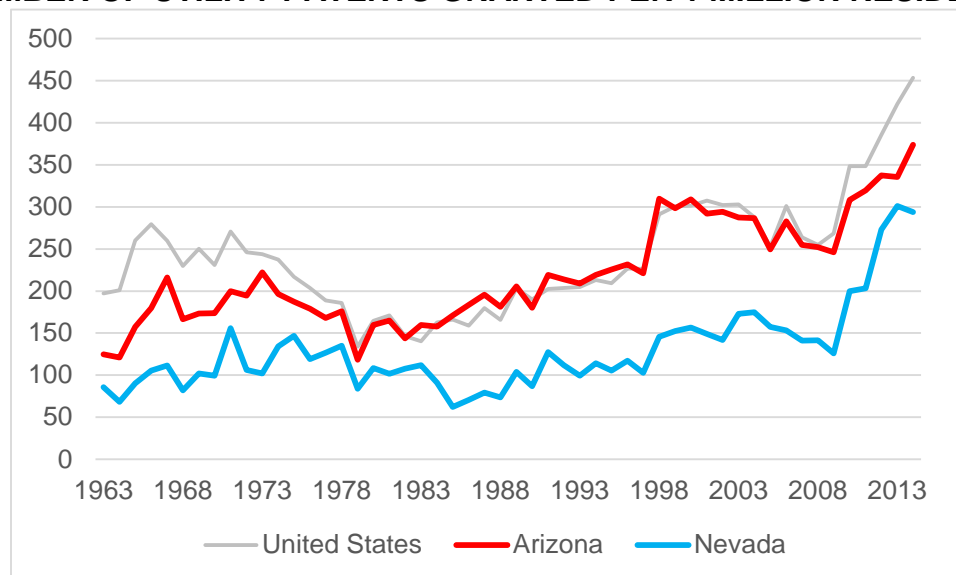
Source: National Science Foundation, <https://ncesdata.nsf.gov/webcaspar/>.

Inventive activity is a proxy for the quality of the innovation environment. The number of patents granted is one measure of a region's ability to innovate. The third human capital indicator is the number of patents granted, expressed on a per capita basis. The U.S. Patent and Trademark Office has annual data dating back to 1963. Only "utility" patents, also known as "patents for inventions," with a United States origin are included. Arizona's figures were considerably less than the national average during the 1960s but rose to slightly above average in most years from 1983 through 2000 (see Chart 6). Arizona's figures relative to the nation have fallen since then, with Arizona 18 percent below average in 2014. Nevada's per capita patents have consistently been considerably less than the U.S. average and less than Arizona's figure. The 2014 figure was 35 percent below the U.S. average and 21 percent less than the Arizona figure.

**Financial Capital.** The importance of research and development (R&D) investment is a central theme of the economic literature on economic growth. Economic analysis suggests that R&D investment is crucial for attaining increases in labor productivity that ultimately translate into improvements in prosperity. The first financial capital indicator is the investment of the state's public universities and businesses in R&D, expressed relative to GDP. The National Science Foundation is the source.

Annual data on industrial R&D goes back to 1975 nationally, but data by state are sporadic prior to 1997. Thus Chart 7 displays expenditures per \$1 million of gross domestic product back to 1997. Industrial R&D spending varies considerably by year. The figures for Arizona generally have been below the national average, but the differential has been small in recent years; it was 3

**CHART 6**  
**NUMBER OF UTILITY PATENTS GRANTED PER 1 MILLION RESIDENTS**



Source: U.S. Patent and Trademark Office, <http://www.uspto.gov/web/offices/ac/ido/oeip/taf/reports.htm>.

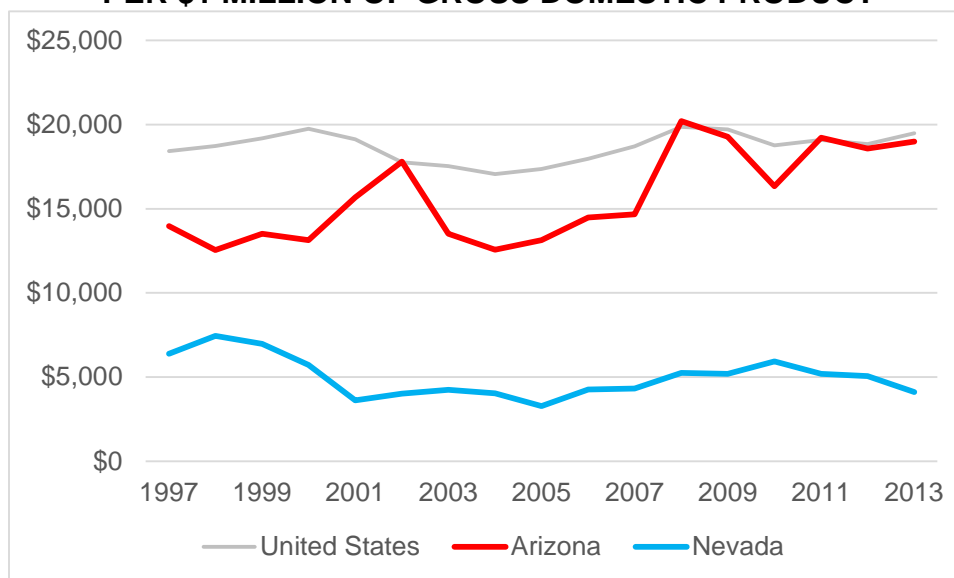
percent in 2013. Industrial R&D spending per \$1 million of gross domestic product in Nevada has been far below the national average; the differential was 79 percent in 2013.

Annual data on academic R&D are available from 1972 through 2014. Academic R&D expenditures are considerably lower than industrial R&D. Overall, Arizona's academic R&D figures exceeded the national average from 1973 through 1996, but have been lower since, with a differential of 7 percent in 2014. Nevada's figures have been much less than the national average. The differential was about 30 percent during the early-to-mid-1970s but grew to 70 percent in recent years.

Academic R&D is reported by source of the funding; the federal government and "institutions" — the universities themselves — are the major sources. The following compares R&D funding relative to GDP in Arizona and Nevada to the nation:

- Federal funding generally has been less in Arizona; the differential was 20 percent in 2014. Nevada has been much further below the national average; the difference in 2014 was 66 percent.
- State and local government funding was much higher than average in Arizona through 1983. Since then it has varied widely but has been below average in all but one year. The differential was 33 percent in 2014. Funding in Nevada also was considerably above average through 1980, but since then has been far below average. The difference was 55 percent in 2014.
- Industry funding has been highly variable, with Arizona's figure ranging from considerably below to well above average. The figure has been below average since

**CHART 7**  
**INDUSTRY RESEARCH AND DEVELOPMENT EXPENDITURES**  
**PER \$1 MILLION OF GROSS DOMESTIC PRODUCT**



Source: National Science Foundation, Division of Science Resources Statistics,  
<http://www.nsf.gov/statistics/industry/>.

2007; the difference in 2014 was 48 percent. Nevada's figure also has ranged widely, but has been far below average since 1997. The differential in 2014 was 91 percent.

- Institutional funding generally has been above average in Arizona, including 29 percent above average in 2014. Nevada's figure generally has been far below average, including a difference of 77 percent in 2014.
- Other funding has been highly variable, with Arizona's figure fluctuating from substantially below to considerably above average. It has been above average since 2010, including 31 percent above average in 2014. Nevada's figure generally has been far below average, including a difference of 83 percent in 2014.

The second financial indicator uses data from the U.S. Small Business Administration (SBA), which administers two competitive programs to distribute federal research and development funds to small, high-technology businesses: Small Business Innovation Research (SBIR, since 1983) and Small Business Technology Transfer (STTR, since 1998). The SBIR program encourages small businesses to explore their technological potential and provides an incentive to profit from commercialization. The STTR is a related program that is designed to facilitate the transfer of technological innovation from nonprofit research institutions to small commercial enterprises. It primarily is a program linking research universities to commercialization efforts. Funding for SBIR is considerably greater than for STTR. Funding for both programs varies considerably by year at the state level.

The innovation grant data can be measured in three ways: the number of grants per capita, the inflation-adjusted value of the grants per capita, and the value of the grants relative to gross domestic product. The latter measure is summarized here. The figure for SBIR grants in Arizona

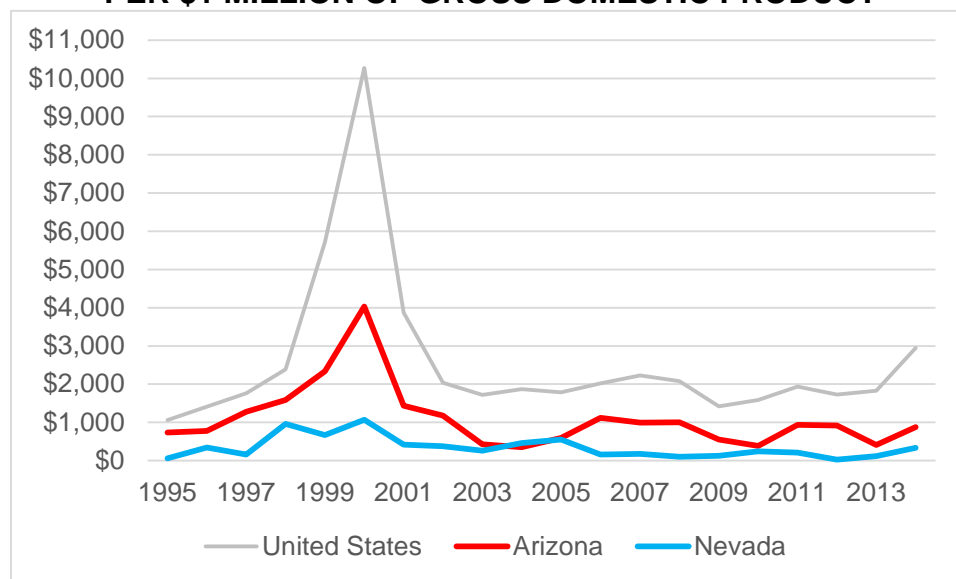


has varied from higher to lower than the U.S. average, with Arizona above average in half of the years. In 2014, Arizona's figure was 16 percent higher. Nevada's SBIR funding generally has been far below the national average; the 2014 figure was 76 percent lower. Arizona has been higher than the national average in most years on funding for the STTR program; the 2014 figure was 72 percent above average. The figure for Nevada usually has been considerably below average; the 2014 figure was 56 percent below average.

The third financial indicator is venture capital, obtained from the MoneyTree Report prepared by PricewaterhouseCoopers and the National Venture Capital Association. Annual data are available for 1995 through 2015. Venture capitalists invest in firms that have a high potential for growth but are not ready to do an initial public offering of stock. The investments tend to be both high risk and high return. Venture capital activity can be used to measure the number of potentially high-growth firms being started. These typically are innovative high-technology firms, such as biotechnology enterprises.

Venture capital can be measured in the same three ways as innovation grants. Venture capital relative to GDP has been far lower in Arizona than the national average. The figure for Nevada generally has been lower than the figure for Arizona, but in some years was comparable (see Chart 8). In 2014 relative to the national average, Arizona's figure was 70 percent less and Nevada's figure was 89 percent less. GDP estimates for 2015 are not yet available, but the per capita value of venture capital relative to the national average was 70 percent lower in Arizona and 85 percent lower in Nevada, with the differential in each state comparable to that of the prior several years.

**CHART 8**  
**VENTURE CAPITAL GRANTED**  
**PER \$1 MILLION OF GROSS DOMESTIC PRODUCT**



Source: PricewaterhouseCoopers and National Venture Capital Association, MoneyTree(tm) Report, <http://www.pwcmoneytree.com/>.

## EDUCATION FUNDING

In order to compare public finance data across geographic areas, the data generally are expressed on either a per capita basis (divided by the population of the state) or per \$1,000 of personal income. Personal income provides an indication of the ability of taxpayers to pay taxes and thus is of particular use in the analysis of public revenues. In states in which per capita personal income is much different from the national average, the adjustment for population size will produce significantly different results than the adjustment for personal income.

If the per capita measure is used, the public finance figures also should be adjusted for the cost of living. The U.S. Department of Commerce's Bureau of Economic Analysis (BEA) publishes annual estimates of living costs by state and metropolitan area, available at <http://www.bea.gov/regional/index.htm>. These "regional price parities" (RPPs) are limited to calendar years 2008 through 2013. When examined over time, per capita public finance figures also need to be adjusted for inflation. The gross domestic product implicit price deflator (GDP deflator), available at <http://www.bea.gov/national/index.htm#gdp>, generally is the preferred measure of inflation.

If caseload data (the number of people served) are available for a particular public program, the caseload is used instead of the population of the state to calculate a per person measure. For education, enrollment is the caseload measure and is available for public elementary and secondary schools and for public institutions of higher education. Various measures of enrollment are available, but the most widely used is a headcount based on a particular date in the fall semester. For higher education, full-time-equivalent (FTE) enrollment, when available, is the preferred measure.

Public finance data are expressed on a fiscal year basis. For example, fiscal year 2016 is the period from July 1, 2015 through June 30, 2016. Since personal income and the GDP deflator are produced quarterly, fiscal year averages can be calculated. Estimates of fiscal year RPPs and population are made by averaging two calendar year figures.

In FY 2013 (the latest data available for the RPPs and for K-12 finance data), the cost of living was slightly lower in Arizona (2.6 percent less than the U.S. average) than in Nevada (1.5 percent less than the U.S. average). Per capita personal income (PCPI) in each state was less than the national average by more than the difference in living costs. Arizona's PCPI adjusted by the RPP was 15.0 percent below average; Nevada's adjusted figure was 10.0 percent below average. Thus, adjusting per student education revenues or expenditures by per capita personal income will not only result in a different comparison to the nation than using the per capita measure, the additional adjustment will have an impact on the comparison of the two states.

When using caseload data, personal income also can be considered by adjusting the public finance data by both the caseload and by per capita personal income. This measure acknowledges that a state's expenditures per student likely are influenced by the ability of residents to pay taxes and fees. However, a consensus does not exist that a state's expenditures should be evaluated relative to the ability to pay. Assuming that lesser spending per student equates to a lower-quality education, if a state spends less than the national average per student (after adjusting for the cost of living) due to the low incomes of its residents, it is putting its

students at a competitive disadvantage when they have to compete with migrants from other states who are seeking the same jobs. In addition, a state with low per pupil spending is jeopardizing the success of its economic development if its students are less qualified than the average student nationally. In fact, the appraisal of the business climate in Arizona and Nevada is negatively affected by the poor results on measures such as educational achievement and educational attainment.

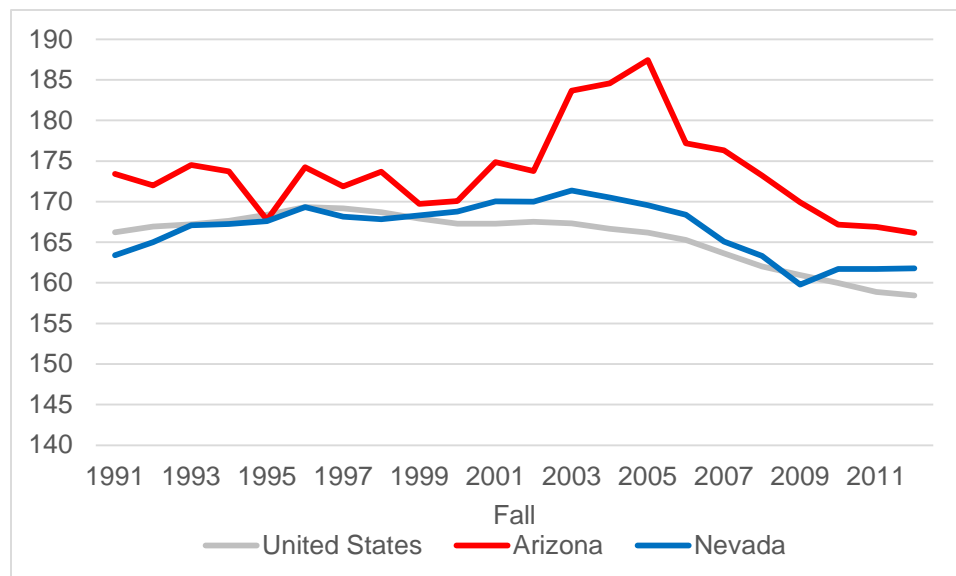
### Elementary and Secondary Education

The Public Elementary-Secondary Education Finance series produced by U.S. Department of Commerce's Census Bureau are used to analyze K-12 funding and expenditures. Data for fiscal years 1992 through 2013 are available online at <http://www.census.gov/govs/school/>.

Public school enrollment for the same years (e.g. fall 1991 enrollment is used for fiscal year 1992) is shown in Chart 9. Per capita enrollment in Nevada has been close to the national average, while per capita enrollment in Arizona has been higher, consistent with the state's above-average fertility rate and above-average share of children.

Revenues raised to support K-12 education are divided by the Census Bureau into three government sources: federal, state, and local. In FY 2013 nationally, 9.1 percent of the revenue came from the federal government, with the balance nearly equally split between state (45.6 percent) and local (45.3 percent) governments. In Arizona, federal funding made up a larger

**CHART 9**  
**ENROLLMENT AT PUBLIC ELEMENTARY AND SECONDARY SCHOOLS**  
**PER 1,000 RESIDENTS**



Sources: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics* (enrollment, <http://nces.ed.gov/programs/digest/>) and U.S. Department of Commerce, Census Bureau (population, obtained from the U.S. Bureau of Economic Analysis: <http://www.bea.gov/regional/index.htm>.)

share (14.6 percent) and local funding was disproportionately used (49.2 percent versus 36.2 percent from state government). In Nevada, state funding was disproportionately used (61.9 percent versus 28.6 percent from local governments; federal funding accounted for 9.5 percent). Since the local versus state government responsibilities for funding K-12 education vary across the states, combined state and local government figures need to be used to compare states.

The Census Bureau separates capital outlays for K-12 education from other expenditures, splitting the latter into current operations and other expenditures (the latter consisting largely of interest payments for debt). Capital outlays are subdivided into construction, land and existing structures, instructional equipment, and other equipment. In FY 2013 nationally, 89 percent of the expenditures were for current operations, 8 percent were for capital outlays, and 3 percent were for other purposes. These shares in Arizona were similar to the national average. In Nevada, a slightly lesser proportion of the total went to capital outlays and more to the “other” category.

Expenditures for current operations are split into three subcategories. The instruction subcategory — wages and salaries, employee benefits, and purchases of supplies directly related to instruction — was the largest in FY 2013, accounting for 61 percent of current operations nationally; the share was lower in Arizona (56 percent) and Nevada (57 percent). The second subcategory of support services accounted for 34 percent of current operations nationally, with a higher share in Arizona (39 percent) and Nevada (39 percent). Support services consist of seven parts: pupil support, instructional staff support, “general” administration (school districts), school administration, plant operations and maintenance, pupil transportation, and other (business support, such as printing, and central support, such as planning). The third subcategory includes such functions as food services and adult education. It accounted for 5 percent of the total nationally and in Arizona and Nevada.

The following analysis focuses on the per student measure, reporting the Arizona and Nevada figures as a percentage of the national average and as a rank among the states (with the District of Columbia included). The FY 2013 figures are adjusted for the cost of living, though this adjustment has little impact on either the ranks or the percentages of the national average, for either Arizona or Nevada. Relative to the per student measure, the percentages of the U.S. average are considerably higher on the per student per \$1,000 of per capita personal income measure (by 21 percent in Arizona and 13 percent in Nevada). The difference in the rank between the per student measure and the per student per \$1,000 of per capita personal income measure varies by category in Arizona and Nevada.

K-12 education finance in Arizona and Nevada in FY 2013 is compared in Table 7. Total revenues exceeded total expenditures in each state, though by more in Arizona. Thus, comparisons of the two states vary depending on whether the revenue or expenditure figures are examined. Total dollar values are presented in the table to provide the relative size of the various categories. Otherwise, the table presents per student ranks and percentages of the national average, adjusted for the cost of living.

Per student K-12 education *revenues* in FY 2013 in Arizona and Nevada were far below the national average, by 36 percent in Arizona and 22 percent in Nevada. Each ranked among the

**TABLE 7**  
**ELEMENTARY AND SECONDARY EDUCATION FINANCE, FISCAL YEAR 2013**

	Dollars in Millions		Per Student, Adjusted for Cost of Living Percentage of U.S. Average			
			Rank*			
	Arizona	Nevada	Arizona	Nevada	Arizona	Nevada
<b>Total Revenues</b>	\$8,098	\$4,130	49	45	63.5%	78.4%
Federal Government	1,178	392	29	41	101.7	81.8
State and Local Government	6,920	3,738	51	45	59.7	78.0
State Government	2,934	2,556	50	26	50.4	106.2
Local Government	3,985	1,182	36	45	59.1	49.5
Property Tax	3,016	1,080	28	33	80.3	69.5
Other	969	102	33	51	48.1	12.2
<b>Total Expenditures</b>	7,595	4,055	51	48	59.7	77.1
Current Operations	6,837	3,622	50	47	60.4	77.4
Instruction	3,824	2,059	51	47	55.8	72.7
Support Services	2,644	1,397	49	40	68.2	87.2
Pupil Support	534	192	35	42	86.4	75.0
Instructional Staff Support	386	217	45	22	74.7	101.4
General Administration	81	46	48	43	38.6	53.0
School Administration	318	263	51	28	52.8	105.5
Plant Operations & Maintenance	771	379	49	39	74.1	88.1
Pupil Transportation	332	165	45	38	66.5	80.0
Other Support Services	222	136	44	28	57.2	84.8
Other Current Operations	369	167	51	49	62.8	68.7
Capital Outlays	558	222	45	46	55.7	53.6
Construction	390	168	40	39	51.0	53.3
Land and Structures	18	28	35	18	28.4	106.0
Equipment: Instructional	34	4	35	47	80.0	20.1
Equipment: Other	116	22	33	46	88.8	40.6
Other Expenditures	200	211	36	9	50.1	127.4
Interest on Debt	200	211	35	7	55.9	140.4
Payments to Other Governments	<1	0	17	20	1.4	0.0

\* Among the 50 states and the District of Columbia; a rank of 1 indicates the highest revenues or expenditures.

Source: U.S. Department of Commerce, Census Bureau, Public Elementary-Secondary Education Finance, <http://www.census.gov/govs/school/> (education finance and number of students) and U.S. Department of Commerce, Bureau of Economic Analysis, <http://www.bea.gov/regional/index.htm> (cost of living).

bottom seven states. Arizona was further below average looking only at state and local government revenue. It received above-average amounts of federal funding, while Nevada's per student federal funding was below average. Per student K-12 education *expenditures* in FY 2013 in Arizona and Nevada also were far below the national average, by 40 percent in Arizona and 23 percent in Nevada. Each ranked among the bottom four states.

Capital outlays per student also were much lower than the national average in Arizona (49 percent lower) and Nevada (47 percent lower). In FY 2013, Nevada's capital outlays

disproportionately went to purchasing land and structures, while Arizona spent relatively more on equipment. Spending per student for purposes other than current operations and capital outlays consists almost entirely of interest payments on debt in Arizona and Nevada. The amount per student was considerably below average in Arizona but above average in Nevada.

The current operations category is the key to evaluating how well a state supports public education. Per student current operations spending was 40 percent below the national average in Arizona and 23 percent below average in Nevada in FY 2013. In each state, per student expenditures were below average in each of the three current operations categories, with Nevada higher than Arizona in each category: instruction, support services, and other current operations. Within the support services category, Arizona's spending was below the national average in each subcategory. Compared to Nevada, Arizona spent more per student on pupil support but less on each of the other subcategories.

A summary of the change in education finance between FYs 1992 and 2013 is presented in Table 8.<sup>5</sup> Fiscal year 1992 was selected as the starting year both for the sake of convenience (it is the

**TABLE 8**  
**ELEMENTARY AND SECONDARY EDUCATION FINANCE,**  
**FISCAL YEARS 1992 THROUGH 2013**

	Change in Percentage of U.S. Average, Per Student					
	1992-to-2000		2000-to-2008		2008-to-2013	
	Arizona	Nevada	Arizona	Nevada	Arizona	Nevada
<b>Total Revenues</b>	-8	-6	-9	-1	-10	-8
Federal Government	-15	1	-15	9	4	12
State and Local Government	-7	-6	-8	-2	-11	-10
State Government	-5	-22	-1	-5	-23	3
Local Government	-9	9	-17	3	1	-22
Property Tax	-8	9	-15	8	-7	-22
Other	-5	11	-19	-7	13	-23
<b>Total Expenditures</b>	-13	-12	-5	2	-15	-19
Current Operations	-5	-5	-5	-2	-9	-5
Instruction	-8	-8	-6	-2	-9	-7
Support Services	-4	-1	-5	-5	-8	-1
Pupil Support	10	-25	5	7	-5	3
Instructional Staff Support	-23	-3	-3	12	29	14
General Administration	-56	6	-13	25	-13	-40
School Administration	-7	-12	-11	-3	-11	1
Plant Operations & Maintenance	7	-12	-14	5	-12	-3
Pupil Transportation	-8	-3	11	6	-8	-9
Other Support Services	23	94	-4	-109	-44	8
Other Current Operations	11	5	-6	10	-16	1
Capital Outlays	-94	-101	9	39	-50	-124
Other Expenditures	-64	-68	-50	-23	-62	-34

Source: U.S. Department of Commerce, Census Bureau, Public Elementary-Secondary Education Finance, <http://www.census.gov/govs/school/>.

<sup>5</sup> This analysis does not consider changes over time in the relative cost of living.

first year of data available online) and because after FY 1992, Arizona began a series of tax reductions that have limited the amount of funding available to K-12 education. The 21-year period is split into three parts: the period from the high point of the previous economic cycle in FY 2008 through FY 2013 and the prior 16 years divided evenly into eight-year periods. The table presents the change in the percentage of the national average in each state. For example, total revenue per student in Arizona was 88 percent of the national average in FY 1992 and 80 percent of the average in FY 2000; the difference of 8 percentage points is reported in the table.

Relative to the national average, per student total revenue fell in each of the three time periods in Arizona. A large decline in state funding occurred between FYs 2008 and 2013. In Nevada, the percentage of the U.S. average also fell in each of the three periods, though not by as much as in Arizona in each period. A shift in funding from state government to local government occurred in Nevada between FYs 1992 and 2008, but this was reversed in the FY 2008-to-2013 period.

Relative to the U.S. average, total K-12 spending per student fell considerably in Arizona between FYs 1992 and 2000 and again between FYs 2008 and 2013, with declines in capital outlays and in current operations. Capital outlays vary widely by year as projects begin and end. Thus, the changes in capital outlays between the specific years shown in Table 8 should be interpreted with caution. Total expenditures per student in Nevada also dropped considerably between FYs 1992 and 2000 and again between FYs 2008 and 2013, but rose slightly versus the U.S. average between FYs 2000 and 2008, a pattern resulting from large swings in capital outlays.

In the key category of current operations spending, the per pupil figures in each state fell relative to the national average throughout the FY 1992-to-2013 period. The decline was greater in Arizona, going from 21-to-41 percent below the national average over the 21 years, compared to a drop from 12-to-24 percent below average in Nevada.

In Arizona and Nevada, per student spending on instruction and on support services fell between FYs 1992 and 2013 relative to the national average. Within the support services category, per student spending fell sharply in Arizona relative to the U.S. average in the general administration category, which includes school district offices. Significant decreases also occurred in the school administration category. In contrast, gains versus the national average occurred in Arizona in the pupil support category between FYs 1992 and 2008. In Nevada, per student gains and losses relative to the nation were erratic over time in the support services subcategories.

The increase in revenue passed in 2015 in Nevada that is intended to be spent on K-12 education should improve the state's ranking, but Nevada likely will remain considerably below average. Similarly, the possible increase in funding for K-12 education in Arizona, subject to a public vote in May, will leave Arizona far below the national average.

### **Higher Education**

The public higher education system in Arizona includes three universities, each of which offers degrees through doctorates. Arizona State University (ASU) and the University of Arizona (UofA) are classified as research universities with very high research activity while Northern Arizona University (NAU) is a research university with high research activity. In addition to the

universities, Arizona has more than 20 community colleges scattered around the state that offer certificates and associate's degrees, though 10 of these are located in Maricopa County.

Unlike Arizona, all of Nevada's institutions of higher education are administered as part of one system. Nevada has two doctoral-granting research universities with high research activity: the University of Nevada at Las Vegas and the University of Nevada at Reno. Nevada State College, located in Henderson (a suburb of Las Vegas) is classified as a baccalaureate school that grants bachelor's degrees but not higher degrees. Nevada has four additional institutions that primarily offer certificates and associate's degrees, but three of these — the College of Southern Nevada (Las Vegas), Great Basin College (Elko), and Western Nevada College (Carson City) — also offer a limited number of bachelor's degrees. Only Truckee Meadows Community College (Reno) is directly comparable to Arizona's community colleges.

Enrollment in fall 2014 at the University of Nevada at Las Vegas (UNLV) was 41 percent of the number at ASU. Compared to ASU, UNLV depends on relatively many part-time faculty, with relatively fewer full-time faculty and graduate assistants. Tuition at UNLV in the 2014-15 school year was 34 percent lower than at ASU for in-state students and 16 percent less for out-of-state students.

The University of Nevada at Reno (UNR) had enrollment in fall 2014 that was 47 percent of the number at the UofA. Compared to the UofA, UNR depends on relatively many part-time faculty, with relatively fewer full-time faculty and graduate assistants. Tuition at UNR in the 2014-15 school year was 40 percent lower than at the UofA for in-state students and 30 percent less for out-of-state students.

Nevada State College is small relative to Northern Arizona University, with tuition considerably lower than at NAU. As a whole, enrollment at Nevada's other four institutions is only 27 percent of the number at Arizona's community colleges. In contrast to the universities, tuition at these institutions in Nevada generally is higher than at Arizona's community colleges, particularly for in-state students.

In the top graph of Chart 10, enrollment at public institutions of higher education is expressed per 1,000 residents; the latest data are for fall 2013. Combined university and community college enrollment in Arizona has been greater on a per capita basis than in Nevada, whose figure was equal to the national average during the 1990s but has been lower since then. A downward trend exists in enrollment per capita in Arizona and Nevada, compared to an increase nationally. The bottom graph of Chart 10 expresses enrollment on a full-time-equivalent basis; the latest data are for fall 2012. Nevada's per capita FTE enrollment has consistently been less than in the nation and Arizona.

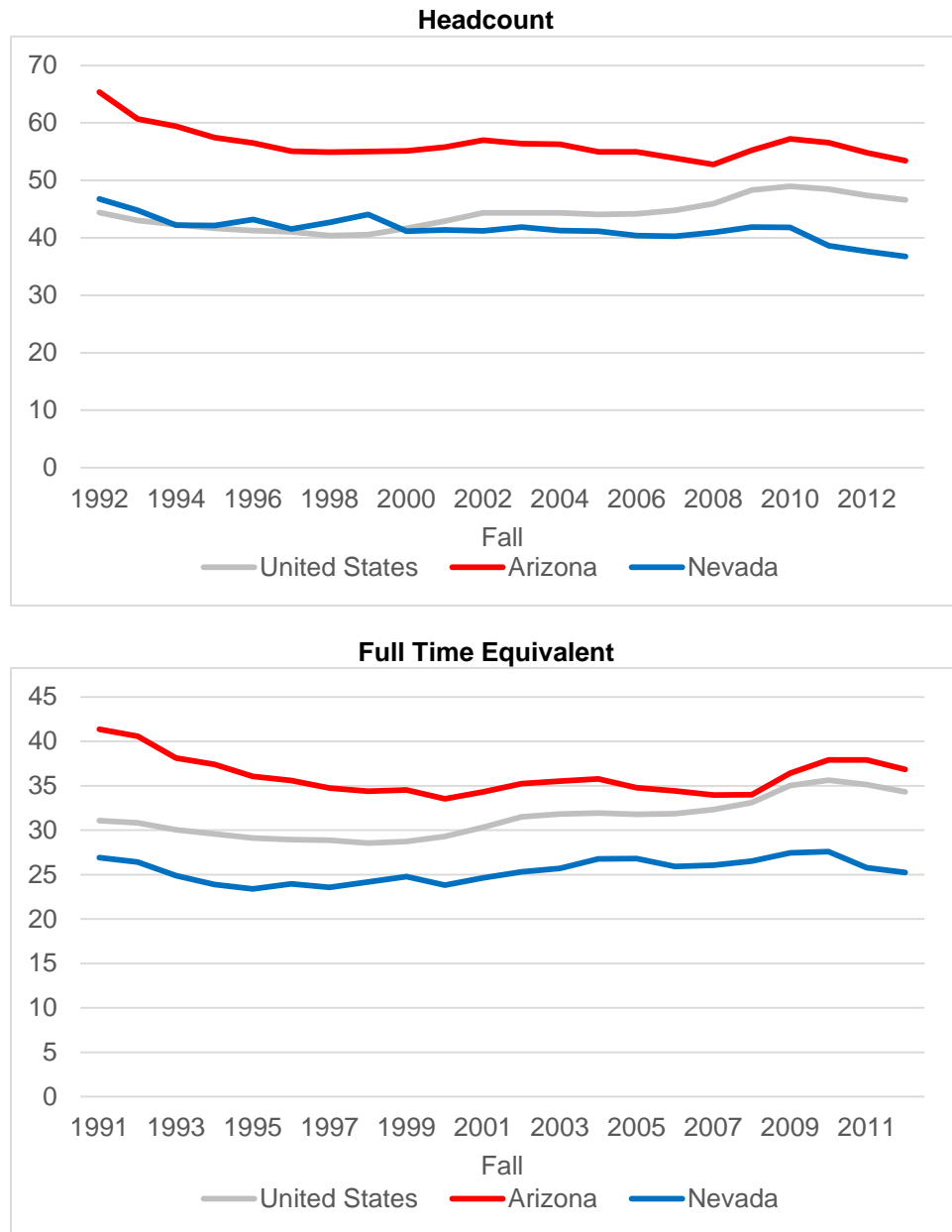
The rest of this section compares the funding for higher education in Arizona and Nevada, using data from three sources. Each dataset has limitations.

### **State Governments**

By collecting detailed data from the state governments of Arizona and Nevada, the sources of funding for higher education can be differentiated. However, numerous differences exist between



**CHART 10**  
**ENROLLMENT AT PUBLIC INSTITUTIONS OF HIGHER EDUCATION**  
**PER 1,000 RESIDENTS**



Note: Enrollment is the total of community colleges and universities.

Sources: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics* (enrollment, <http://nces.ed.gov/programs/digest/>) and U.S. Department of Commerce, Census Bureau (population, obtained from the U.S. Bureau of Economic Analysis: <http://www.bea.gov/regional/index.htm>.)

Arizona and Nevada in the accounting for higher education, and a variety of data limitations are present. Moreover, using only state government data to compare states is misleading since a specific government function may be performed by state government in one state but by local governments in another state. For example, all institutions of higher education in Nevada are part of the same state system of higher education, administered by the state Board of Regents. All of the funding for higher education is reported at the state government level. In Arizona, community colleges are separate from universities and state government provides limited funding to community colleges. According to the Census Bureau, 28 percent of the total higher education funding in Arizona in FY 2013 came from local governments. Thus, a comparison of only state government funding exaggerates the amount by which Nevada exceeds Arizona on public support for higher education.

In Arizona, the Joint Legislative Budget Committee (JLBC) provides expenditure data for the university system, with data available for each university and for the Board of Regents, for fiscal years 1979 through 2015.<sup>6</sup> Total funding is divided into that coming from the general fund, “other state funds” (which almost entirely consist of university tuition and fees), and not-appropriated monies, such as from the federal government. The JLBC also reports state government funding for community colleges for each of these three categories. However, the state accounts for only a small portion of community college funding.<sup>7</sup> The funding figures for higher education are taken from the annual “Appropriations Report” prepared by the JLBC, using the actual figures for the prior fiscal year instead of the initially approved appropriations.

The counterpart in Nevada to Arizona’s JLBC is the Fiscal Analysis Division of the Nevada Legislative Counsel Bureau.<sup>8</sup> Total funding for higher education is divided into that coming from the general fund, from “other state funds” (also consisting almost entirely of tuition and fees), and from other sources, though Nevada’s inclusion of these other sources is not as extensive as in Arizona and therefore is not comparable. Since Nevada employs a biennial budget, its “Appropriations Report” is produced every other year, but with annual budget figures included.

Noncapital expenditures for higher education from the state general fund are shown in Chart 11. These are the raw figures, not reflecting inflation or changes in enrollment. In fiscal years 1999 through 2001, Nevada’s expenditures were less than 35 percent of the total in Arizona. By FY 2016, Nevada’s figure had climbed substantially relative to Arizona, reaching 74 percent. Funding in Arizona fell 43 percent from the FY 2008 peak through FY 2016, not considering inflation and enrollment growth. The decline in Nevada from the FY 2009 peak was 22 percent.

Between fiscal years 1999 and 2003, higher education funding as a share of the state government general fund budget was nearly steady in both Arizona and Nevada, with the share in Arizona between 75-and-79 percent of the share in Nevada. Since then, the higher education share has fallen more in Arizona than Nevada, as seen in Chart 12. The budgeted share for FY 2016 in Arizona is only 53 percent of the share in Nevada.

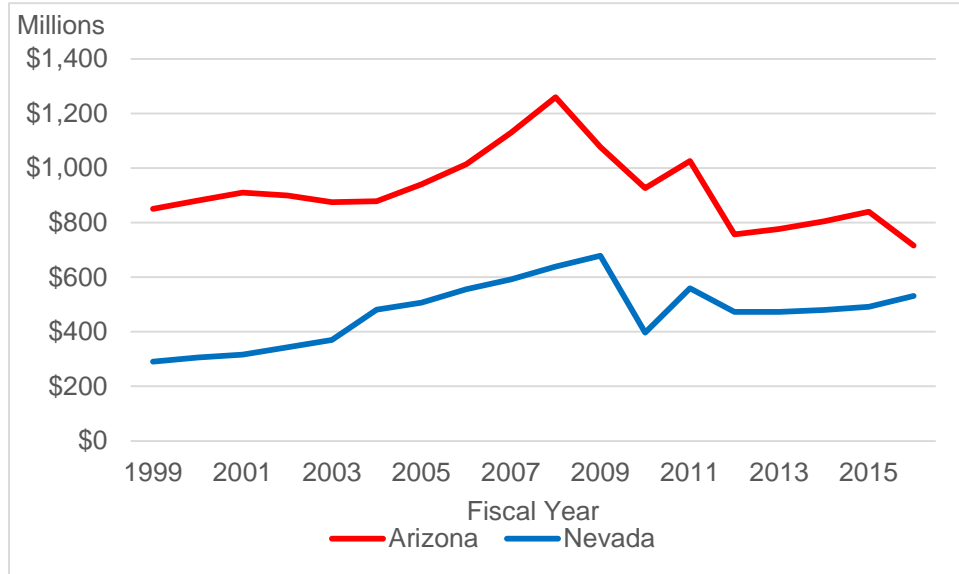
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<sup>6</sup> Arizona Joint Legislative Budget Committee, <http://www.azleg.gov/jlbc/fiscal.htm>.

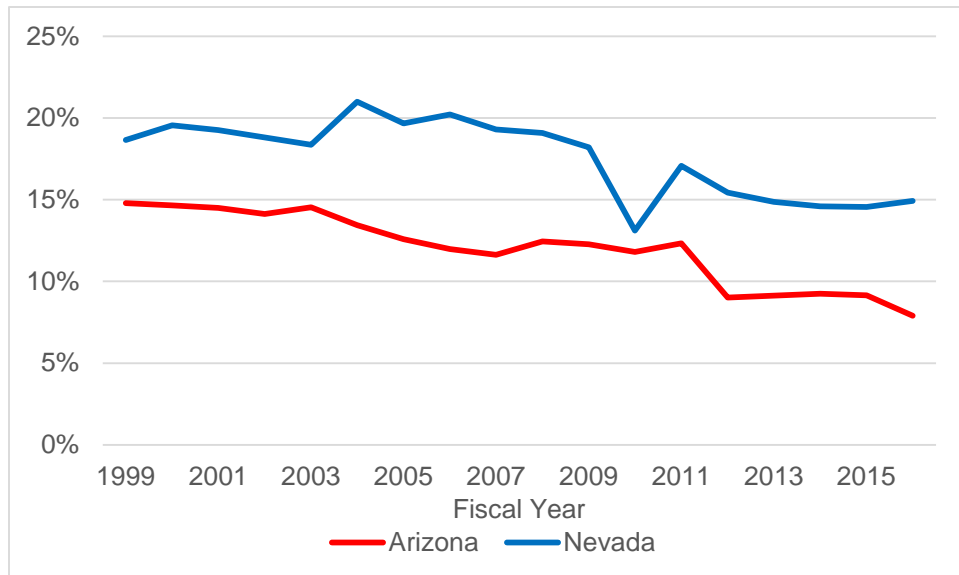
<sup>7</sup> A central source of funding data for the community colleges does not exist, but each community college district uses a standard form to report their budget.

<sup>8</sup> Nevada Fiscal Analysis Division, <http://www.leg.state.nv.us/division/fiscal/>.

**CHART 11**  
**NONCAPITAL EXPENDITURES FOR PUBLIC HIGHER EDUCATION**  
**FROM THE STATE GOVERNMENT GENERAL FUND,**  
**NOT ADJUSTED FOR INFLATION OR CHANGES IN ENROLLMENT**



**CHART 12**  
**PUBLIC HIGHER EDUCATION SHARE**  
**OF STATE GOVERNMENT GENERAL FUND NONCAPITAL EXPENDITURES**



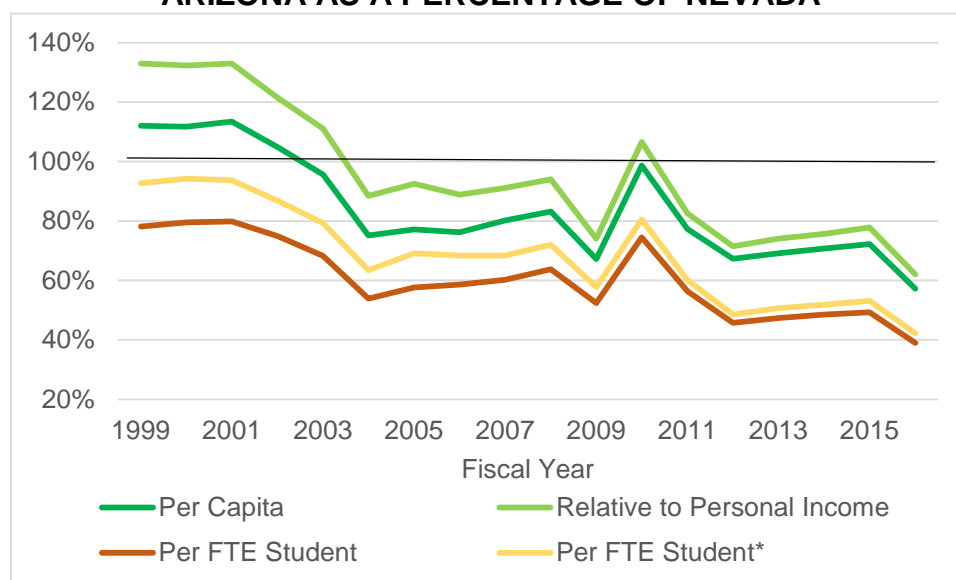
Note: Expenditures are the total of community colleges and universities.

Sources (Charts 11 and 12): Arizona Joint Legislative Budget Committee (<http://www.azleg.gov/jlbc/fiscal.htm>) and Nevada Legislative Counsel Bureau, Fiscal Analysis Division (<http://www.leg.state.nv.us/division/fiscal/>).

As seen in Chart 13, the relationship between Arizona and Nevada on university funding is similar on each of the four measures illustrated. Noncapital expenditures for higher education from the state government general fund have fallen considerably in Arizona relative to Nevada. On the per capita and per \$1,000 of personal income measures, Arizona has gone from higher than Nevada in FY 1999 to approximately 40 percent lower in FY 2016. Funding per FTE student in Arizona was lower than in Nevada even in FY 1999, but has since fallen to approximately 60 percent lower than in Nevada in FY 2016.

Chart 14 tracks expenditures per FTE student, the preferred measure, over time in Arizona and Nevada on an inflation-adjusted basis. From FYs 1999 through 2001, Arizona's figure was between 20-and-22 percent less than the figure for Nevada. In FY 2016, the difference was 61 percent. If these figures were adjusted for the relative cost of living in each state, the Arizona line in the chart would rise slightly relative to the Nevada line (at least over the 2008-13 time period).

**CHART 13**  
**NONCAPITAL EXPENDITURES FOR PUBLIC HIGHER EDUCATION**  
**FROM THE STATE GOVERNMENT GENERAL FUND,**  
**ARIZONA AS A PERCENTAGE OF NEVADA**

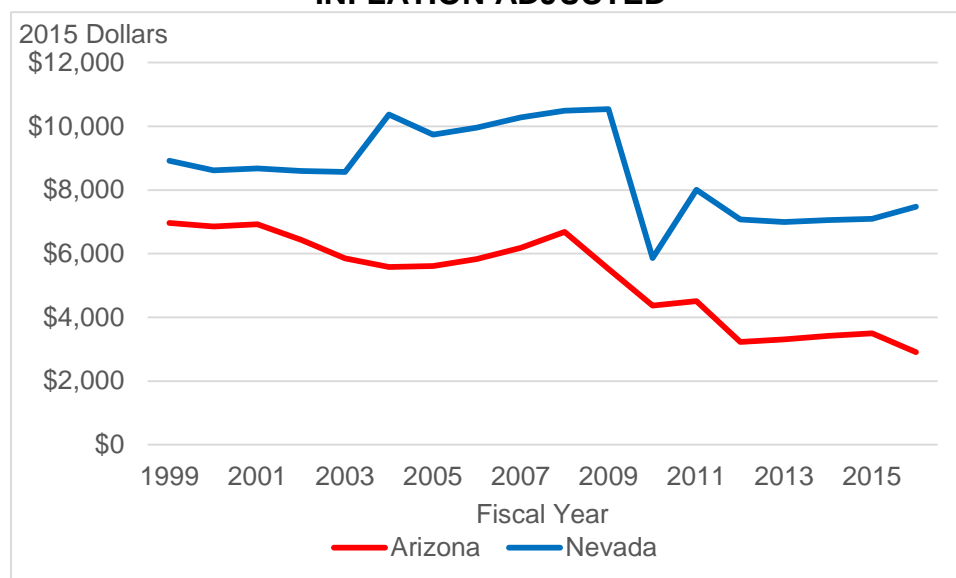


\* Adjusted by per capita personal income.

Note: Expenditures are the total of community colleges and universities.

Sources: Arizona Joint Legislative Budget Committee (Arizona expenditures, <http://www.azleg.gov/jlbc/fiscal.htm>), Nevada Legislative Counsel Bureau, Fiscal Analysis Division (Nevada expenditures, <http://www.leg.state.nv.us/division/fiscal/>), U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics* (enrollment, <http://nces.ed.gov/programs/digest/>, 2015-16 estimated), U.S. Department of Commerce, Bureau of Economic Analysis (personal income, per capita personal income, and GDP implicit price deflator, <http://www.bea.gov/>, 2016 estimated), and U.S. Department of Commerce, Census Bureau (population, <http://www.census.gov/popest/data/state/totals/2015/index.html>, 2016 estimated).

**CHART 14**  
**NONCAPITAL EXPENDITURES FOR PUBLIC HIGHER EDUCATION FROM THE**  
**STATE GOVERNMENT GENERAL FUND PER FULL-TIME-EQUIVALENT STUDENT,**  
**INFLATION ADJUSTED**



Note: Expenditures are the total of community colleges and universities.

Sources: Arizona Joint Legislative Budget Committee (Arizona expenditures, <http://www.azleg.gov/jlbc/fiscal.htm>), Nevada Legislative Counsel Bureau, Fiscal Analysis Division (Nevada expenditures, <http://www.leg.state.nv.us/division/fiscal/>), U.S. Department of Education, National Center for Education Statistics *Digest of Education Statistics* (enrollment, <http://nces.ed.gov/programs/digest/>, 2015-16 estimated), and U.S. Department of Commerce, Bureau of Economic Analysis (GDP implicit price deflator, <http://www.bea.gov/national/index.htm#gdp>, 2016 estimated).

This comparison of higher education appropriations per FTE student by state government does not take into account the differences in the higher education systems of Arizona and Nevada. The exclusion of much of the funding for community colleges in Arizona exaggerates the funding differences between the two states. In contrast, each of the universities in Arizona is a research institution, two with very high research, which is the most costly category of higher education to operate. Nevada does not have a university with very high research and one institution simply offers bachelor's degrees, which are lower-cost options.

### Census Bureau

The U.S. Census Bureau publishes data on state and local government revenues and expenditures by state on an annual basis.<sup>9</sup> Revenues from all sources are included, but the amount from each source of funding — such as state government appropriations, tuition, or the federal government — is not provided. For higher education, capital outlays are reported separately from other expenditures. The focus in this paper is funding excluding capital outlays and debt servicing.

<sup>9</sup> U.S. Department of Commerce, Census Bureau, State and Local Government Finance, <http://www.census.gov/govs/>.

The Census Bureau collects its data from state and local governments. State government data are reported separately from local government data by the Census Bureau, but the combined state and local government data generally are used for comparisons across states. In most years, local governments are sampled, so these data are subject to sampling error; inaccuracies also have been found in state government data reported by the Census Bureau. Another shortcoming of the Census Bureau's government finance data is timeliness, with FY 2013 figures the latest available. A major advantage of the Census Bureau's data is that it standardizes the unique accounting systems of each state.

This analysis differs from that in the preceding section by considering all sources of funding for public institutions of higher education. Since it includes tuition revenue, it is less desirable as an indicator of public support for higher education than an indicator limited to appropriations.

The Census Bureau data are available for fiscal years 1964 through 2013, but this analysis focuses on the period since FY 1992.<sup>10</sup> Per student funding is the focus in this section, which includes data for the nation as well as for Arizona and Nevada. Data on capital outlays as well as for noncapital expenditures are available.

Chart 15 compares state and local government noncapital expenditures for higher education per FTE student in Arizona and Nevada to the national average. Both states have fallen over time relative to the national average, with a greater decline in Nevada. Expenditures in Arizona were lower than in Nevada through FY 2008, but were higher from FYs 2009 through 2013. Since per capita personal income in Arizona has consistently been considerably below the national average, noncapital expenditures for higher education per FTE student relative to PCPI have been much higher in Arizona relative to the national average than without considering PCPI, though the figure generally has been below the U.S. average. In Nevada, the PCPI ratio to the nation has fallen over time was above to below average, causing the dotted blue line in Chart 15 to go from higher to lower than the solid blue line. Except in one year, noncapital expenditures for higher education per FTE student relative to PCPI was higher in Arizona than in Nevada.

Capital outlays for higher education are highly volatile from year to year. Per FTE student, the median difference from the national average over the FY 1992-to-2013 period was -9 percent in Arizona and -5 percent in Nevada. The figure in Nevada generally was higher than in Arizona through fiscal year 2009, but Arizona's figure was considerably higher from FYs 2010 through 2013.

## **SHEEO**

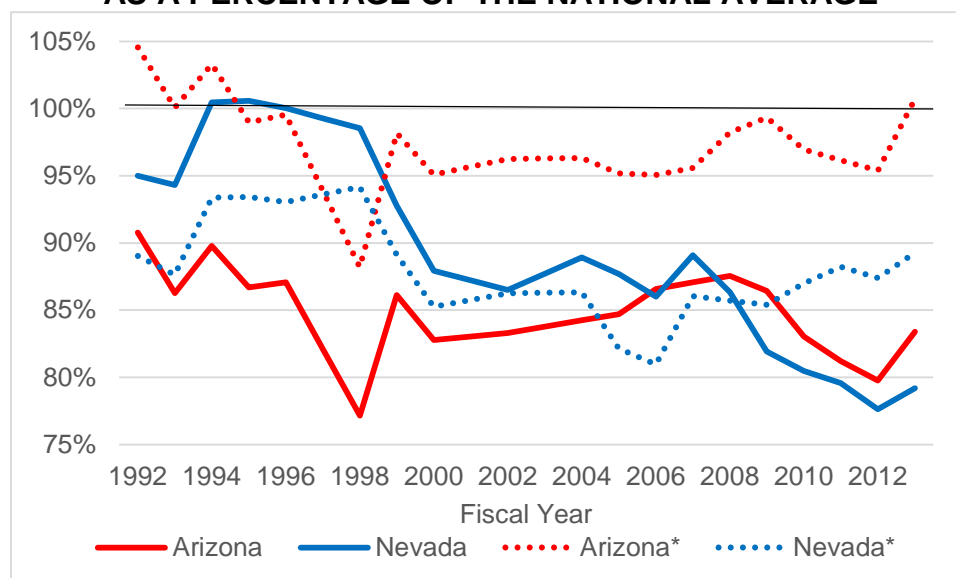
The State Higher Education Executive Officers Association released the latest of their annual reports on "State Higher Education Finance" on April 15, 2015.<sup>11</sup> The time series runs from fiscal years 2000 through 2014. The SHEEO data are not as comprehensive as the Census Bureau's data. Federal funding is not included, except for monies distributed through the

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<sup>10</sup> The Census Bureau did not report data for 2001 or 2003 and the capital-noncapital split was not provided in 1997. In the charts, missing data are interpolated.

<sup>11</sup> State Higher Education Executive Officers Association, <http://www.sheeo.org/projects/shef-%E2%80%94state-higher-education-finance>.

**CHART 15**  
**NONCAPITAL EXPENDITURES FOR PUBLIC HIGHER EDUCATION BY STATE**  
**AND LOCAL GOVERNMENTS PER FULL-TIME-EQUIVALENT STUDENT**  
**AS A PERCENTAGE OF THE NATIONAL AVERAGE**



\* Per FTE student relative to per capita personal income.

Note: Expenditures are the total of community colleges and universities and include funding from all sources, including tuition.

Sources: U.S. Department of Commerce, Census Bureau, State and Local Government Finance, (expenditures, <http://www.census.gov/govs/>); U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics* (enrollment, <http://nces.ed.gov/programs/digest/>); and U.S. Department of Commerce, Bureau of Economic Analysis (per capita personal income, <http://www.bea.gov/>).

American Recovery and Reinvestment Act of 2009 (ARRA) for fiscal years 2009 through 2012.<sup>12</sup> Capital outlays and debt payments are not included. Thus, the SHEEO data are a bit narrower in scope than the Census Bureau data.

SHEEO collects their data from contacts in each state. While instructions are provided to state sources that report the data to SHEEO, inconsistencies in reporting are a concern. Appropriations, not actual expenditures, are reported.

Unlike the Census Bureau, SHEEO reports the amount of funding by category. Five categories are of interest:

- “State Support for Public Higher Education”: state government appropriations and ARRA. Other than the ARRA monies, this category is conceptually the same as in the prior “State

<sup>12</sup> Arizona received ARRA funding for higher education only in FYs 2009 and 2010; Nevada received funding only in FY 2010.

Governments” subsection. However, differences in the annual data between the two data sources are present.

- “Local Support for Higher Education”: local government funding.
- “Educational Appropriations”: the part of state and local support available for operating expenses, calculated by subtracting appropriations for special purposes, research, and medical programs.
- “Net Tuition”: tuition and fees less state and institutional financial aid, student waivers and discounts, and medical student tuition and fees.
- “Total Educational Revenue”: educational appropriations plus net tuition, less tuition revenue used for capital outlays or debt service. Because of the inclusion of tuition, total educational revenue is considered to be less meaningful than educational appropriations in evaluating public support for public higher education.

SHEEO creates its own measure of inflation, which is based 25 percent on the gross domestic product implicit price deflator and 75 percent on the employment cost index for management and professional occupations. Typically, the inflation rate from this measure is between the lower rates measured by the consumer price index and the higher rates measured by the higher education price index, but little difference in the rates has been measured in recent years.

For comparisons across states, SHEEO provides two other adjustments:

- A measure of the cost of living by state is provided, but the data come from a 2003 study and is held constant across the 2000-to-2014 time period. A more timely and accurate measure is now available from the U.S. Bureau of Economic Analysis (BEA).<sup>13</sup>
- A measure of the enrollment mix is included to reflect differences by state in the share of enrollment at different types of institutions of higher education. The measure was calculated using fiscal year 2011 data. Like the cost of living, the value is held constant across the 2000-to-2014 time period.

While each of these adjustments is conceptually desirable, SHEEO’s adjusted funding data are de-emphasized in this paper due to the use of the inferior cost-of-living measure and holding each adjustment factor constant over the 2000-to-2014 period.

Based on SHEEO’s dataset, state support for public higher education — including ARRA monies from FYs 2009 through 2010 — per FTE student was considerably lower in Arizona than in Nevada throughout the FY 2000-to-2014 period, with the differential growing from 27 percent in FYs 2000 and 2001 to about 48 percent from FYs 2012 through 2014. State government appropriations for higher education per FTE student as a percentage of the national average are shown in the top graph of Chart 16 for Arizona and Nevada.

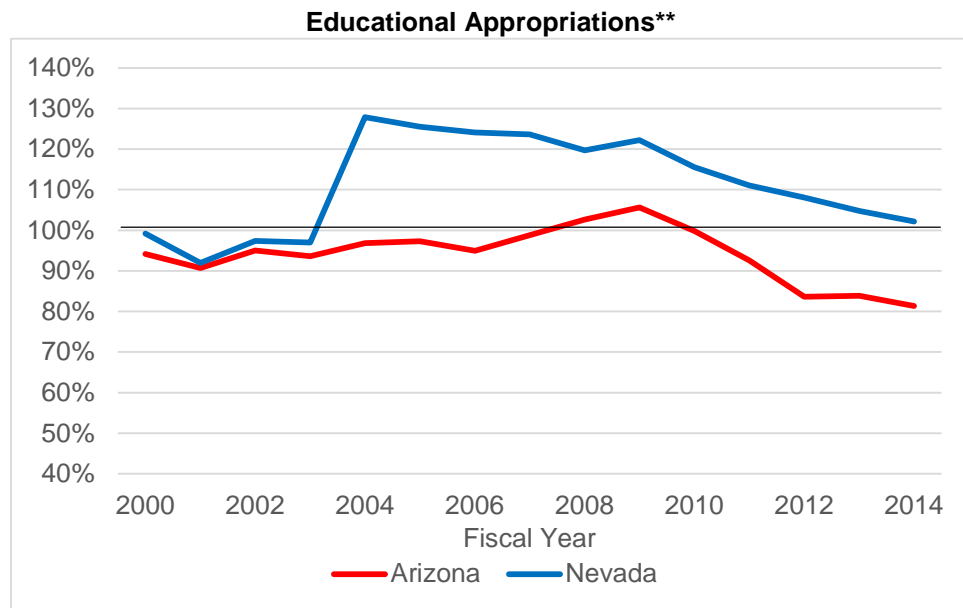
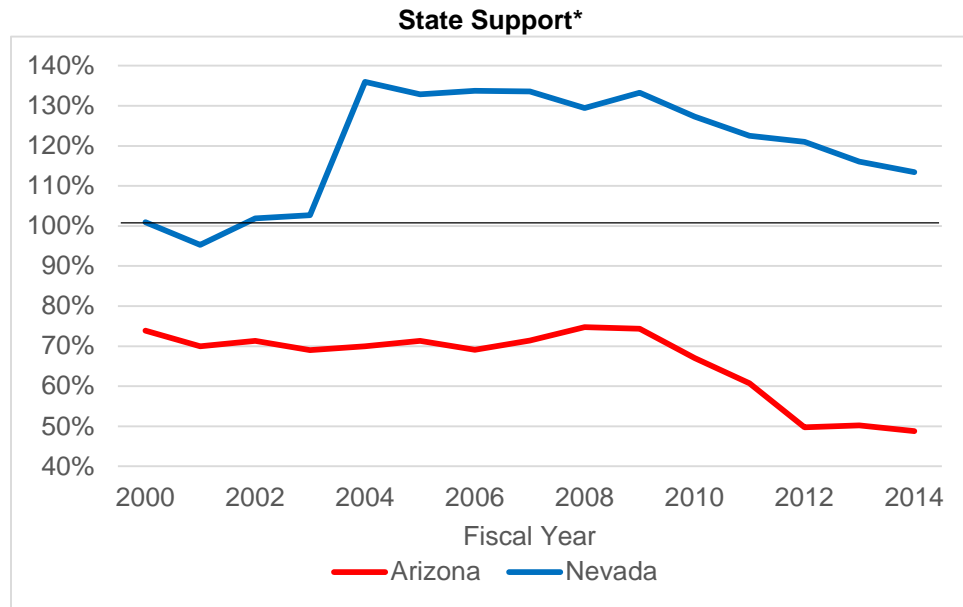
This focus on state government support is incomplete and misleading. Arizona is one of a minority of states that partially support higher education with local government funding. Local

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<sup>13</sup> The BEA’s regional price parities were discussed earlier. According to SHEEO, Arizona’s index is 3.6 percent below the national average while the BEA reports it to have declined from 0.6 percent above average in 2008 to 2.9 percent below average in 2013. For Nevada, the index is 1.4 percent above average according to SHEEO versus a decline from 0.8 percent above average in 2008 to 1.8 percent below average according to the BEA. Overall, SHEEO’s measure and the figures from the BEA have a correlation of about 0.77.



**CHART 16**  
**NONCAPITAL APPROPRIATIONS FOR PUBLIC HIGHER EDUCATION**  
**PER FULL-TIME-EQUIVALENT STUDENT**  
**AS A PERCENTAGE OF THE NATIONAL AVERAGE**



\* Includes state appropriations, not including tuition monies, for community colleges and universities; federal ARRA monies in fiscal years 2009 and 2010 are included.

\*\* Consists of state support and local support for community colleges and universities, less appropriations for special purpose, research, and medical programs. Tuition monies are not included.

Source: State Higher Education Executive Officers Association, <http://www.sheeo.org/projects/shef-%E2%80%94-state-higher-education-finance>.

government funding per FTE student was the highest in the nation in Arizona in each fiscal year from 2000 through 2014. Nevada provides no funding through local governments.

Thus, looking at SHEEO's category of educational appropriations provides a better assessment of public support for higher education. As seen in the bottom graph of Chart 16, Arizona's total state and local government support for higher education was lower than in Nevada in each fiscal year from 2000 through 2014, but the differential was not nearly as large as indicated by state appropriations. From FYs 2000 through 2003, educational appropriations per FTE student were barely lower in Arizona than in Nevada, with both states a little below the national average. Funding rose considerably in Nevada in FY 2004, to almost 30 percent above average. While Nevada's funding relative to the nation gradually fell off after that to barely above the U.S. average in FY 2014, funding in Arizona dropped significantly between FYs 2009 and 2012, to nearly 20 percent below average.

Arizona's rank among the 50 states on educational appropriations per FTE student was mostly in the mid-20s between FYs 2000 and 2011, but was 34th in FY 2014. Nevada's rank rose from the 20s before FY 2004 to the top 10, but dropped back to 17th in FY 2014. Among the 10 western states, Arizona generally ranked fifth between FYs 2000 and 2009, but was eighth in FY 2014. Nevada's rank ranged from first to fourth; it was fourth in 2014.

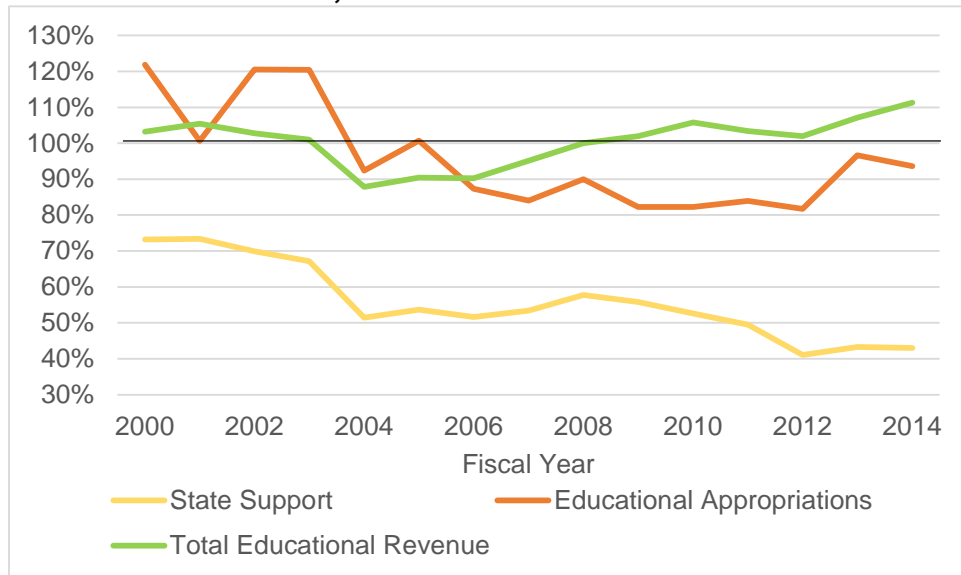
Tuition is another significant source of funding for higher education. Tuition per FTE student at public institutions of higher education in Arizona was about 5 percent below the national average from FYs 2000 through 2007. Arizona's figure relative to the U.S. average has climbed since then, reaching 16 percent above average in FY 2014. Arizona's national rank on tuition per FTE student was in the low 30s through FY 2007 but was 23rd in FY 2014. Arizona's tuition figure generally has been third highest among 10 western states.

Tuition per FTE student has been considerably lower in Nevada than in Arizona. Relative to the national average, the tuition figure in Nevada was nearly 30 percent below average from FYs 2000 through 2003. The differential has been about 35 percent since then. Nevada generally has had a national rank between 40th and 45th, and generally has ranked eighth among the western states, on tuition per FTE student.

Another measure reported by SHEEO is total educational revenue, which adds net tuition revenue (excluding tuition monies used for capital outlays or debt servicing) to educational appropriations. Arizona's total educational revenue per FTE student generally has been a little below the national average; the differential was 5 percent in FY 2014. Nevada's figure went from more than 10 percent below average between FYs 2001 and 2003 to above average from FYs 2004 through 2009, but was 14 percent below average in FY 2014.

Arizona's rank among the 50 states on the total educational revenue per FTE student measure was in the mid-30s between FYs 2000 and 2006, then rose into the mid-20s before falling back; the rank was 30th in FY 2014. Nevada's rank climbed from the upper 30s prior to FY 2004 to 18th in FY 2004, but has gradually lowered since then to 43rd in FYs 2013 and 2014. Among the 10 western states, Arizona generally ranked fifth between FYs 2000 and 2006, but was second in FY 2014. Nevada's rank rose from seventh to first but has since dropped to eighth.

**CHART 17**  
**NONCAPITAL FUNDING FOR PUBLIC HIGHER EDUCATION PER FULL-TIME-EQUIVALENT STUDENT, ARIZONA AS A PERCENTAGE OF NEVADA**



Note: Expenditures are the total of community colleges and universities.

Source: State Higher Education Executive Officers Association, <http://www.sheeo.org/projects/shef-%E2%80%94state-higher-education-finance>.

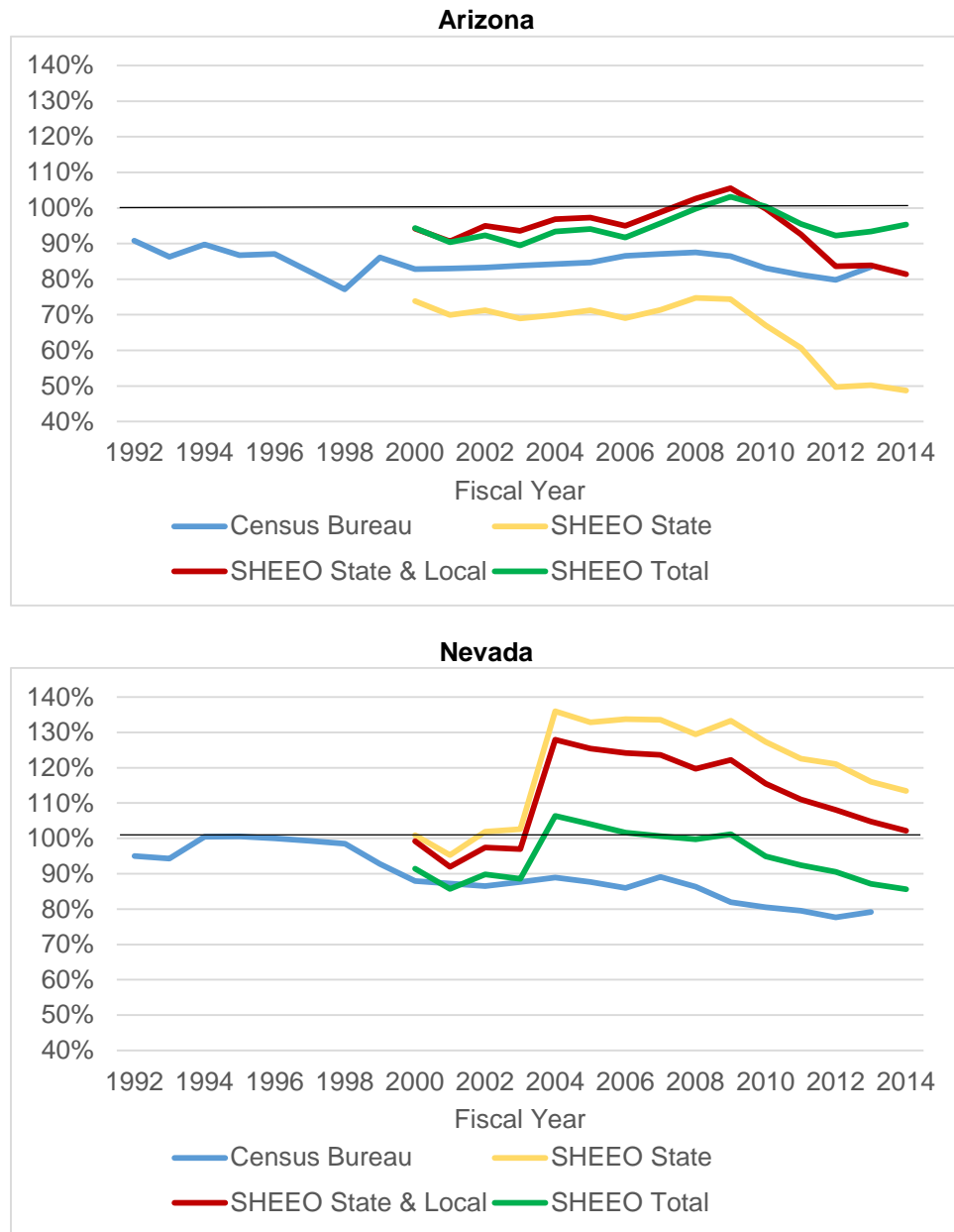
Arizona's higher education funding per FTE student is shown as a percentage of the Nevada figure in Chart 17. Despite being far below Nevada on the state support measure, Arizona's total appropriations measure was higher than Nevada prior to FY 2004 and was not much below Nevada in FYs 2013 and 2014. On the broadest measure of total educational revenue per FTE student, Arizona's figure has been higher than in Nevada since FY 2009, due to the larger tuition increases in Arizona.

### Comparison of Indicators

Higher education funding per FTE student as a percentage of the national average is shown in Chart 18 for each of four measures. The figures for Arizona, shown in the top graph, indicate that funding in Arizona has consistently been below average except for briefly around FY 2009. Due to a sharp decline in state funding between FYs 2009 and 2012, total state and local government appropriations dropped. However, because of the increase in tuition, total revenue did not fall substantially. A further decline in state funding in FY 2016 likely will cause the state to fall further below the national average.

The figures for Nevada, shown in the bottom graph of Chart 18, indicate that funding in Nevada has decreased relative to the national average since FY 2004 on each measure. Total state and local government appropriations still were marginally above the national average in FY 2014. However, due to the state's relatively low tuition, total revenue per FTE student dropped to more than 10 percent below average in FY 2014.

**CHART 18**  
**NONCAPITAL FUNDING FOR PUBLIC HIGHER EDUCATION PER FULL-TIME-EQUIVALENT STUDENT AS A PERCENTAGE OF THE NATIONAL AVERAGE**



Note: Expenditures are the total of community colleges and universities.

Sources: State Higher Education Executive Officers Association (expenditures, <http://www.sheeo.org/projects/shef-%E2%80%94state-higher-education-finance>); U.S. Department of Commerce, Census Bureau, State and Local Government Finance, (expenditures, <http://www.census.gov/govs/>); and U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics* (enrollment, <http://nces.ed.gov/programs/digest/>).

## ECONOMIC PROFILE

The employment-to-population ratio is a simple indicator that provides some insight into prosperity since the ratio is correlated to per capita income. The ratio fluctuates with the economic cycle; it peaked in 2007 nationally and in Arizona (the peak was 2006 in Nevada) and was lowest in 2010. In 2014, the ratio was 58.3 nationally. The Nevada figure was a little lower at 56.9 while the Arizona figure was only 51.4. Going back to 1970, Arizona's ratio has consistently been less than the national average. Historically, the figure for Nevada was higher than for the nation, but the differential shrunk from 1980 through 2009; since then, the figure for Nevada has been less than for the nation.

Since the employment-to-population ratio includes children and people of retirement age, a better measure is to calculate the ratio based only on the working-age population. Using ACS data for 2010 through 2014, the employment-to-population ratios for various age groups are shown in Table 9. Arizona's shortfall in the ratio from the national average is not as great using the ACS data that exclude children and senior citizens as in the BEA data, but the results are consistent with those from the BEA data. Regardless of the age group selected, the employment-to-population ratio was lower in Arizona and slightly lower in Nevada than the national average. Among both men and women, the employment-to-population ratio was lower in Arizona and slightly lower in Nevada than the national average.

### Composition of Economy

Most commonly, economic activity is categorized by the North American Industry Classification System (NAICS), in which the total is divided first into 20 sectors, then progressively into subsectors, industry groups, and industries. Except for the nation, the more detailed data frequently are withheld due to the federal disclosure laws. Because of the switch from the old Standard Industrial Classification (SIC) to the NAICS, a long time series of industrial data is not available.

Sectoral data are available from several sources and for various economic measures. The most commonly used at the state level are the annual GDP estimates produced by the BEA and the monthly employment estimates produced by the U.S. Department of Labor's Bureau of Labor Statistics (BLS). The monthly employment figures are particularly useful due to their timeliness. However, the estimates are subject to sampling error and only cover a subset of wage and salary

**TABLE 9**  
**EMPLOYMENT-TO-POPULATION RATIO, 2010-14 AVERAGE**

Age Group	Total			Male			Female		
	United States	Arizona	Nevada	United States	Arizona	Nevada	United States	Arizona	Nevada
16 and Older	58.1%	54.1%	57.4%	62.8%	58.6%	61.4%	53.6%	49.8%	53.4%
20 to 64	70.6	67.4	69.3	74.9	72.1	73.5	66.4	62.7	64.9
25 to 64	71.7	68.2	69.9	76.6	73.5	74.6	66.9	63.0	65.0
25 to 54	75.2	72.0	73.5	80.2	77.3	78.4	70.3	66.7	68.4

Source: U.S. Department of Commerce, Census Bureau, American Community Survey, Table B23001, <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.

workers. The BEA annually reports total employment, but the data are not released until nine months after the end of a year.

Economic activity also can be categorized by the Standard Occupational Classification (SOC), in which the total is divided into 22 major occupational groups and subdivided into 840 occupations. Like the industrial data, the more detailed occupational data frequently are withheld for states.

Occupational employment and wage estimates are reported annually for states by the BLS through its occupational employment statistics program (<http://stats.bls.gov/oes/>). This program surveys employers; the results are subject to survey error. Though data are reported annually, the data are not designed to be used as a time series. Among the limitations for use as a time series is that the survey cycle runs over six semiannual periods (the survey is done in May and November). Thus, two-thirds of the sample is the same in two consecutive years. The latest available data include the May 2014 survey.

## **Sectors**

The GDP and total employment figures from the BEA are summarized in Table 10 by sector. Relative to GDP, the sectoral shares are considerably different as measured by employment, since some sectors are labor intensive while others are capital intensive with high earnings.

Arizona's sectoral mix in 2014 varied from the national average primarily in the relatively small size of the manufacturing sector. This was offset largely by the relatively large size of the administrative and waste management services sector and the real estate and rental sector. The sectoral share of retail trade also was above average. The professional, scientific and technical services sector and the information sector were relatively small.

The sectoral mix in Nevada was very different from the national average. The accommodation and food services sector was far larger in Nevada; the arts, entertainment and recreation; and retail trade sectors also were disproportionately large in Nevada. Offsetting this was a much smaller manufacturing sector and a lesser sectoral share in a number of other sectors, including professional, scientific and technical services; information; health care and social assistance; wholesale trade; and agriculture.

The sectoral mix in Nevada also was quite different from that in Arizona. Sectoral shares in most sectors — particularly manufacturing; wholesale trade; information; finance and insurance; administrative and waste management services; health care and social assistance; and government — were higher in Arizona than in Nevada. Sectoral shares were larger in Nevada particularly in accommodation and food services, but also in arts, entertainment and recreation; mining; and transportation and warehousing.

Subsectoral data from the BEA (for 2014 for employment and for 2013 for GDP) allow a closer look at the differences in industrial composition between the two states. The much larger sectoral share in Nevada in the accommodation and food services sector mostly was in the accommodation subsector, but the food services subsector also was larger in Nevada. The larger share in Nevada in the arts, entertainment, and recreation sector particularly was due to the

**TABLE 10**  
**GROSS DOMESTIC PRODUCT AND EMPLOYMENT**  
**BY INDUSTRIAL SECTOR, 2014**

	Gross Domestic Product			Employment		
	United States	Arizona	Nevada	United States	Arizona	Nevada
	Billions of Dollars			Number of Employees (000)		
TOTAL	\$17,233	\$286.6	\$135.0	185,799	3,462	1,615
	Share of Total			Share of Total		
Agriculture	1.25%	0.87%	0.24%	1.93%	1.35%	0.46%
Mining	2.63	2.18	4.86	0.91	0.69	1.30
Utilities	1.63	1.94	1.35	0.31	0.36	0.25
Construction	3.85	4.68	4.56	5.17	5.13	4.94
Manufacturing	12.17	8.36	4.68	6.99	4.94	2.91
Wholesale Trade	6.06	5.61	4.17	3.46	3.10	2.42
Retail Trade	5.79	7.64	7.56	10.07	10.92	10.42
Transportation & Warehousing	2.93	2.97	4.25	3.35	2.92	3.88
Information	4.79	2.85	2.14	1.78	1.58	1.20
Finance and Insurance	7.10	7.17	4.97	5.29	6.26	5.41
Real Estate and Rental	13.04	15.06	13.89	4.38	6.39	6.31
Professional & Technical Services	6.92	5.39	4.66	6.90	6.26	5.38
Management of Companies	1.96	1.32	2.54	1.26	1.01	1.52
Administrative & Waste Services	3.05	4.41	3.21	6.32	8.24	6.89
Educational Services	1.12	1.14	0.42	2.39	2.13	0.95
Health Care & Social Assistance	7.12	8.00	5.59	11.21	10.78	7.60
Arts, Entertainment & Recreation	1.00	1.05	2.79	2.23	2.16	3.20
Accommodation & Food Services	2.83	3.40	14.64	7.25	7.64	19.59
Other Services	2.21	2.15	1.97	5.86	5.30	4.94
Government	12.53	13.81	11.52	12.93	12.85	10.41

Source: U.S. Department of Commerce, Bureau of Economic Analysis,  
<http://www.bea.gov/regional/index.htm>.

amusement and gambling subsector, but the performing artists subsector also contributed. While Arizona is known as a state with considerable tourism, it is dwarfed by the amount of tourism in Nevada, largely tied to gambling and related activities.

The only other sectors with a share larger in Nevada than in Arizona were mining and transportation and warehousing. While Arizona is known for its metal mining, this activity is proportionately larger in Nevada. The differential in the transportation and warehousing sector largely was in the transit subsector, related to tourism.

In each of the other sectors, the share in Arizona was larger than in Nevada. Generally, subsector shares in these sectors were about the same or larger in Arizona in each of the subsectors. The large difference in the manufacturing sector resulted almost entirely from the durable goods subcategory, especially the electronics and transportation equipment subsectors. The difference in finance and insurance was especially in the insurance carriers subsector.

## Occupational Groups

In most occupational groups, the shares of total employment in Arizona in 2014 were not much different from the national average. Arizona had lesser shares in the production occupational group and in the transportation and material moving group, offset by higher shares in the office and administrative support, sales and related, and protective service occupational groups. In contrast, the occupational mix in Nevada was substantially different from the national average, and from the mix in Arizona. Relative to the nation, Nevada had lesser shares in the production, education and training, business and financial operations, healthcare practitioners, healthcare support, computer and mathematical, and architecture and engineering groups. The shares were far above the national average in the food preparation and serving, personal care, and building and grounds cleaning and maintenance groups, and also above average in the protective services group (see Table 11).

**TABLE 11**  
**EMPLOYMENT AND WAGES BY OCCUPATIONAL GROUP, 2014**

	Employment			Median Wage*	
	United States	Arizona	Nevada	Arizona	Nevada
	Number in Thousands				
TOTAL	135,128	2,527	1,190	96.3%	94.8%
	Share of Total				
Management	4.99%	5.01%	4.80%	90.1	85.1
Business and Financial Operations	5.05	5.08	3.47	91.2	87.7
Computer and Mathematical	2.84	3.26	1.36	93.9	89.8
Architecture and Engineering	1.79	2.01	0.98	94.5	94.3
Life, Physical, and Social Science	0.85	0.70	0.63	88.7	98.8
Community and Social Service	1.43	1.55	0.87	92.6	115.0
Legal	0.78	0.73	0.75	90.3	98.3
Education, Training, and Library	6.24	5.55	4.26	82.9	95.2
Arts, Design, Entertainment, Sports, Media	1.33	1.22	1.44	83.4	103.6
Healthcare Practitioners and Technical	5.81	5.49	4.23	105.5	120.4
Healthcare Support	2.92	2.59	1.87	108.9	118.6
Protective Service	2.44	3.15	3.27	107.2	89.5
Food Preparation and Serving Related	9.09	9.53	14.57	99.5	114.2
Building & Grounds Cleaning & Maint.	3.24	3.09	5.95	92.7	133.2
Personal Care and Service	3.07	3.31	6.03	99.7	94.6
Sales and Related	10.54	11.43	10.85	98.6	99.5
Office and Administrative Support	16.01	17.49	15.75	98.2	98.7
Farming, Fishing, and Forestry	0.33	0.53	0.04	91.4	155.1
Construction and Extraction	3.91	4.32	4.47	90.9	116.3
Installation, Maintenance, and Repair	3.88	4.03	3.91	97.2	114.3
Production	6.61	4.22	3.41	98.4	95.3
Transportation and Material Moving	6.84	5.70	7.09	99.3	103.5

\* Expressed as a percentage of the national average.

Source: U.S. Department of Labor, Bureau of Labor Statistics, occupational employment statistics program, <http://stats.bls.gov/oes/>.



The overall median hourly wage in the occupational dataset in Arizona in 2014 was \$16.46 — 3.7 percent less than the U.S. average of \$17.09. Arizona’s figure was 0.8 percent below average after adjusting by the 2013 regional price parity. Nevada’s median hourly wage of \$16.13 was 5.6 percent below average (3.9 percent below average after adjustment for the cost of living).

In Arizona, the median wage adjusted for the cost of living was higher than the U.S. average in 10 of the 22 occupational groups, including a differential of more than 8 percent in three groups: healthcare practitioners and technical, healthcare support, and protective service. In three groups, the adjusted median wage was at least 8 percent below the national average: education, training and library; arts, design, entertainment, sports, and media; and life, physical, and social sciences.

In Nevada, the adjusted median wage was higher than the national average in 14 groups, including a differential of more than 10 percent in eight groups. In contrast, the adjusted median in Nevada was at least 8 percent below average in four groups. Though the overall median wage in Nevada was less than in Arizona, the median was higher in 13 of the 22 groups. The disproportionate number of jobs in low-wage occupations caused the overall median to be lower than in Arizona.

### **Job Quality**

A measure of job quality can be calculated using either the sectoral data or the occupational group data. Job quality is defined by the average wage or average compensation (compensation includes benefits and wages) by sector or occupational group, expressed relative to the national average. The calculation consists of summing over all sectors, subsectors, or occupational groups:

(The difference in the share of employment between the state and the nation) times (the ratio of the national sectoral or subsectoral average compensation to the overall national average compensation minus 1) times 100.

More detailed data would provide a more precise estimate but data unavailability below the subsectoral and occupational group levels limits the amount of detail that can be used to calculate job quality.

### **Industrial**

Arizona’s industrial job quality in 2014 was lower than the national average while job quality in Nevada was significantly worse than in the nation. At the sectoral level, job quality in Arizona was -3.4, compared to -11.4 in Nevada.

Based on average compensation nationally, the 20 sectors can be divided into three categories. In eight of the sectors, average compensation in 2014 was at least 33 percent higher than the overall average. These eight sectors accounted for 38.9 percent of the overall employment nationally, 36.4 percent in Arizona, but only 29.5 percent in Nevada. The sectoral shares in Arizona were particularly higher than in Nevada in the manufacturing and government sectors — but Arizona’s shares in these sectors were considerably below the national figures.

In four sectors, average compensation nationally in 2014 was between 12 percent lower and 19 percent higher than the overall average. These four sectors accounted for 20.6 percent of the overall employment nationally, 19.5 percent in Arizona, and 17.7 percent in Nevada.

Average compensation nationally in the other eight sectors in 2014 was at least 22 percent lower than the overall average. These eight sectors accounted for 40.4 percent of the overall employment nationally, 44.1 percent in Arizona, and 52.8 percent in Nevada. The sectoral share in Nevada was far higher than in Arizona or the nation in the low-wage accommodation and food services sector.

Thus, Arizona and Nevada each had a disproportionately high share of workers in low-paying sectors and a below-average share in high-paying sectors, resulting in the below-average overall measure of industrial job quality.

Based on the more detailed subsectoral data, industrial job quality in Arizona and Nevada in 2014 was not quite as far below average as measured by sectors. At the subsectoral level, Arizona's job quality in 2014 was -2.3, compared to -10.5 in Nevada.

### **Occupational**

Since compensation data are not available from the occupational dataset, average wage is used instead in the calculation of job quality. Arizona's occupational job quality in 2014 was marginally better than the national average while job quality in Nevada was significantly worse than in the nation. At the occupational group level, Arizona's job quality in 2014 was 0.2, compared to -8.4 in Nevada.

Based on the national average wage, the 22 occupational groups can be divided into three categories. In seven of the groups, the average wage in 2014 was at least 48 percent higher than the overall average. These seven groups accounted for 22.1 percent of the overall employment nationally, 22.3 percent in Arizona, but only 16.2 percent in Nevada. The occupational group shares in Arizona were particularly higher than in Nevada in the high-wage computer and mathematical, architecture and engineering, health practitioners, and business/financial occupational groups.

Six occupational groups had a national average wage in 2014 between 7 percent lower and 18 percent higher than the overall average. These six groups accounted for 19.2 percent of the overall employment nationally, 19.8 percent in Arizona, and 18.2 percent in Nevada.

The other nine occupational groups had a national average wage in 2014 of at least 18 percent lower than the overall average. These nine groups accounted for 58.7 percent of the overall employment nationally, 57.9 percent in Arizona, but 65.6 percent in Nevada. The occupational group shares in Nevada were particularly higher than in Arizona in the low-wage food preparation and serving, personal care, and building and grounds cleaning and maintenance occupational groups.

Thus, Nevada had a disproportionately high share of workers in low-paying occupations and a below-average share in high-paying occupations, resulting in its poor overall measure of occupational job quality.

### **High Technology**

High-technology activities can be classified by occupation or by industry.

## Occupations

In this paper, high-technology is defined as the combination of three occupational groups — computer and mathematical; architecture and engineering; and life, physical, and social sciences. In Chart 19, high-technology employment as a share of total employment is shown for each year from 2001 through 2014 — though the data were not designed to be used on a time-series basis.

The overall high-tech share has consistently been considerably lower in Nevada than the nation, while the share in Arizona was below the nation only in 2006, 2007 and 2008 and only marginally.

In the computer and mathematical occupational group, the share in Nevada has consistently been substantially lower than the nation; Arizona's share was a little below the nation from 2002 through 2010. The architecture and engineering share has been consistently higher in Arizona than the nation, though the size of the differential has narrowed in recent years. Nevada's share has been lower than the nation throughout the time series. In the life, physical, and social sciences group, the share in Nevada also was consistently lower than the nation. Arizona's share generally has been slightly higher than in Nevada.

The median wage in each of the three high-technology occupational groups was substantially higher than the median wage of all occupations in 2014, in Arizona, Nevada, and the nation (see Chart 20). In each category, the median wage in Arizona was less than the national figure. The median in Nevada, relative to Arizona, was higher in the life, physical, and social sciences group but lower in the computer and mathematical group. The difference from the national average in the high-tech occupational groups was greater than the overall difference of all occupations in Arizona and Nevada. This suggests that the high-tech job mix in these states is tilted toward occupations that pay lower wages.

The below-average cost of living in Arizona and Nevada contribute to the below-average high-tech wages. However, even after adjustment for living costs, the medians generally were less than the national figure:

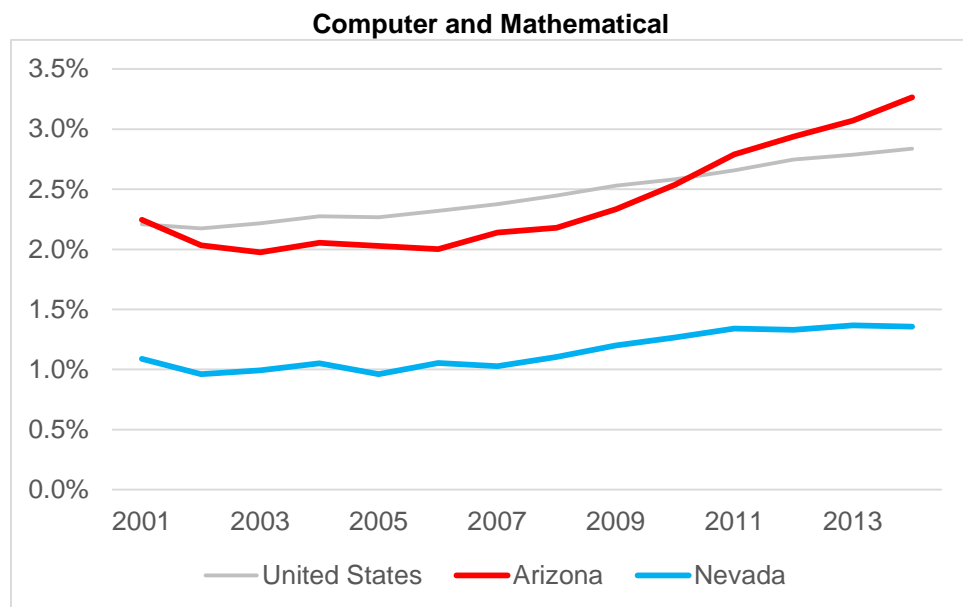
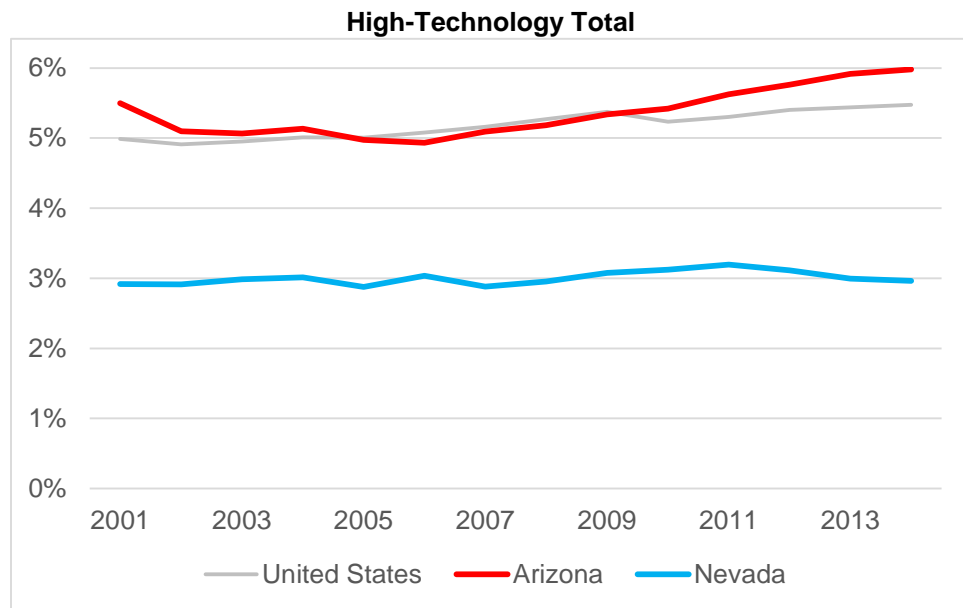
- Computer and mathematical: 3 percent less in Arizona, 9 percent less in Nevada.
- Architecture and engineering: 3 percent less in Arizona, 4 percent less in Nevada.
- Life, physical, and social sciences: 9 percent less in Arizona, 1 percent higher in Nevada.

## Industries

The industrial definition of high technology used in this report is based on definitions created by the U.S. Bureau of Labor Statistics, the American Electronics Association, and Carnegie Mellon University. Most of the 17 components are industry groups — a four-digit NAICS code shown in parentheses in the following list — but a few are subsectors or industries:

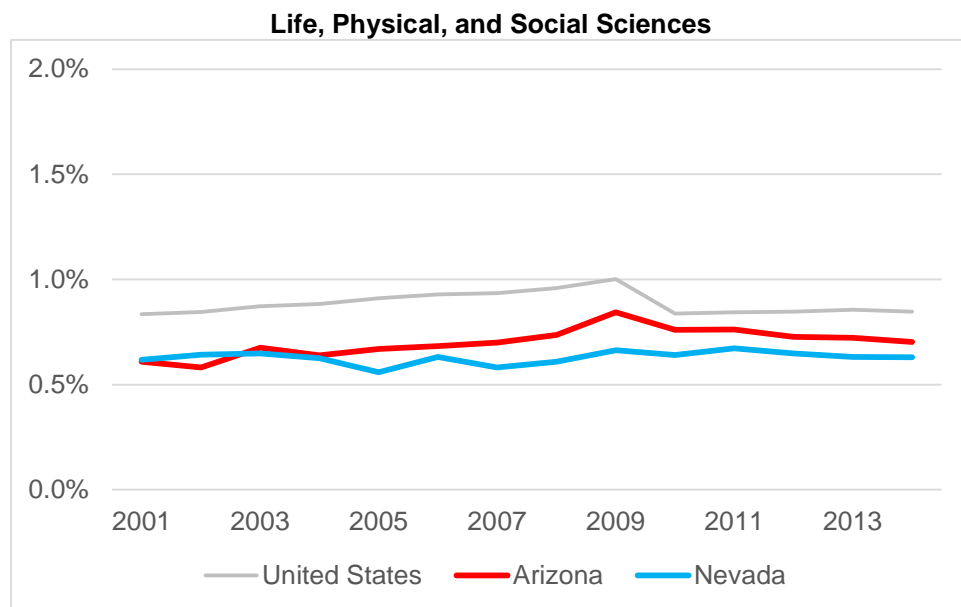
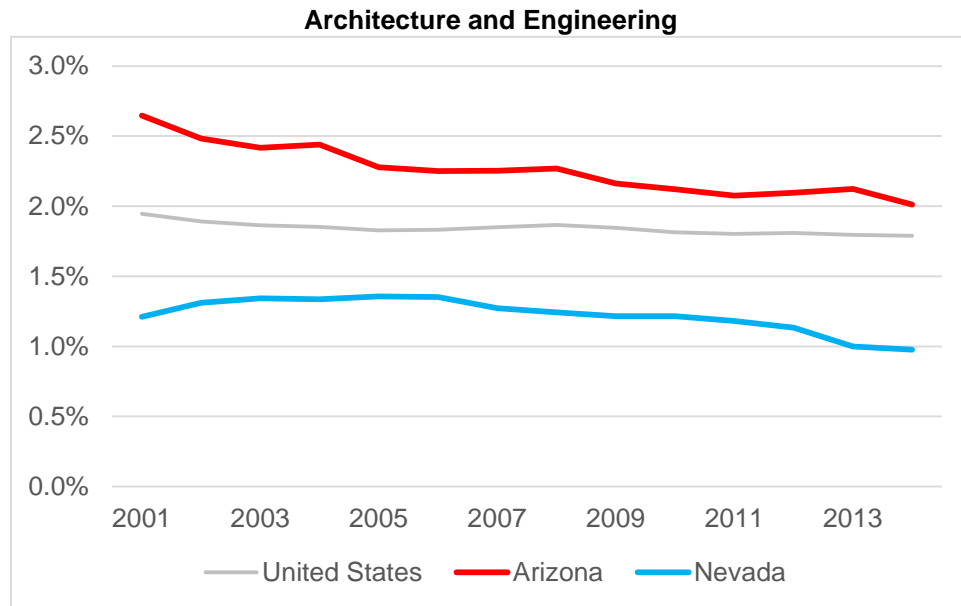
- High-technology manufacturing activities:
  - pharmaceutical and medicine (3254)
  - optical instruments and lenses (333314)
  - computer and peripheral equipment (3341)
  - communications equipment (3342)
  - audio and video equipment (3343)

**CHART 19**  
**HIGH-TECHNOLOGY EMPLOYMENT DEFINED BY OCCUPATIONAL GROUP**  
**AS A SHARE OF TOTAL EMPLOYMENT**



(continued)

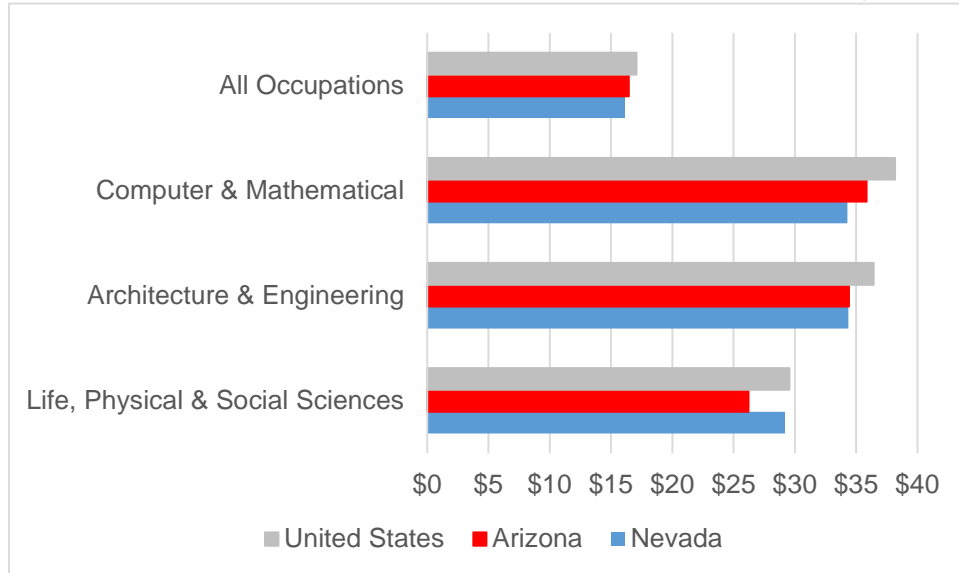
**CHART 19 (continued)**  
**HIGH-TECHNOLOGY EMPLOYMENT DEFINED BY OCCUPATIONAL GROUP**  
**AS A SHARE OF TOTAL EMPLOYMENT**



Note: Though shown as lines to ease comparisons, the occupational data were not designed to be used on a time-series basis.

Source: U.S. Department of Labor, Bureau of Labor Statistics, occupational employment statistics program, <http://stats.bls.gov/oes/>.

**CHART 20**  
**MEDIAN HOURLY WAGE BY OCCUPATIONAL GROUP, 2014**



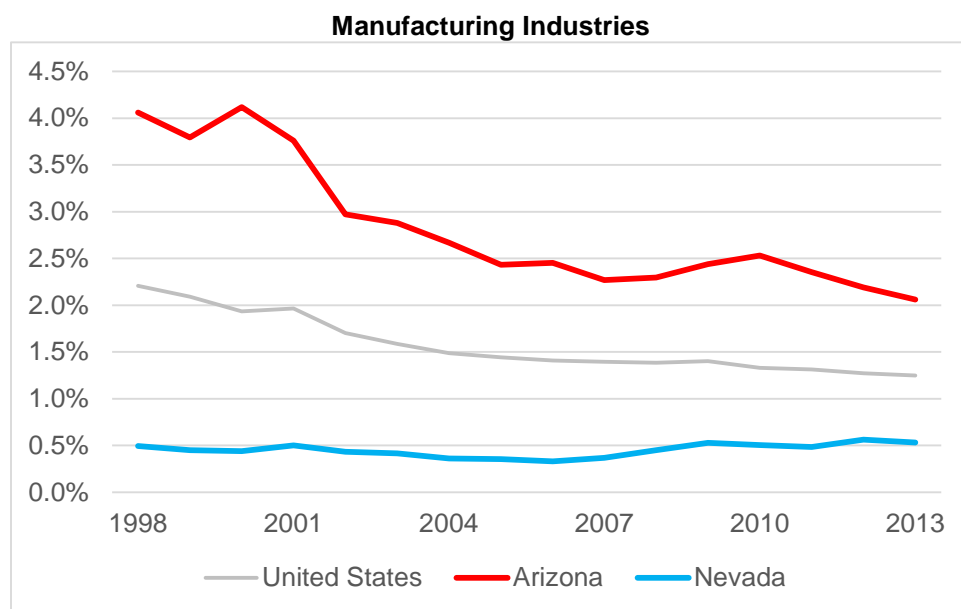
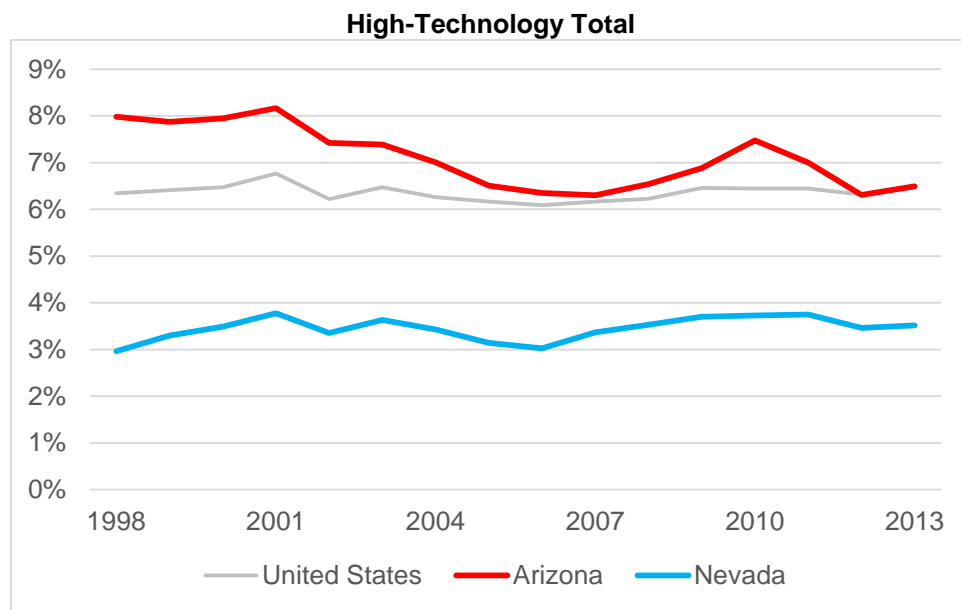
Source: U.S. Department of Labor, Bureau of Labor Statistics, occupational employment statistics program, <http://stats.bls.gov/oes/>.

- semiconductor and other electronic components (3344)
- navigational, measuring, electromedical, and control instruments (3345)
- aerospace products and parts (3364)
- High-technology service activities:
  - commercial equipment merchant wholesalers (4234)
  - software publishers (5112)
  - telecommunications (517)
  - data processing, hosting, and related (5182)
  - Internet publishing and broadcasting and web search portals (51913)
  - engineering services (54133)
  - testing laboratories (54138)
  - computer systems design and related (5415)
  - scientific research and development (5417)

The annual *County Business Patterns* dataset produced by the U.S. Department of Commerce's Census Bureau (<http://www.census.gov/econ/cbp/>) was used to obtain employment estimates by year from 1998 through 2013; the figures can be analyzed on a time series basis. The annual employment figure is as of the week of March 12 and includes part-time as well as full-time employees. Certain activities, most notably farms and government, are not included in the dataset. For Arizona and Nevada, employment figures for some components of the high-technology measure had to be estimated in some years due to the data being withheld by the federal government.

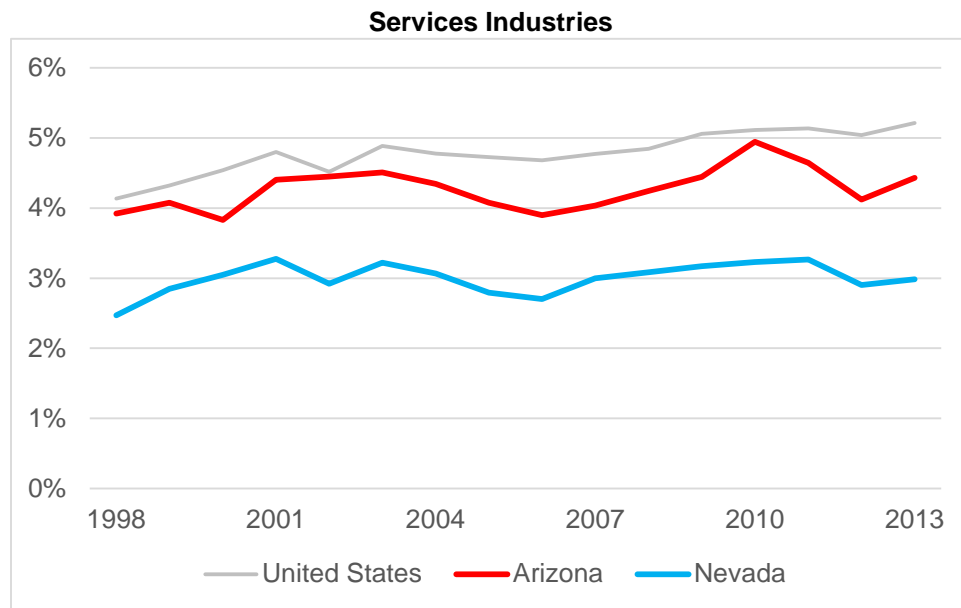
In Chart 21, high-technology employment as a share of the total is shown for the nation, Arizona, and Nevada. The high-tech share in Nevada was lower than the national average and Arizona throughout the 1998-to-2013 period. In contrast, Arizona's share historically was higher than the nation but by 2013 was about equal to the national average, as the share in Arizona declined over time while the shares nationally and in Nevada exhibited little change.

**CHART 21**  
**HIGH-TECHNOLOGY EMPLOYMENT DEFINED BY INDUSTRY**  
**AS A SHARE OF TOTAL NONFARM, PRIVATE-SECTOR EMPLOYMENT**



(continued)

**CHART 21 (continued)**  
**HIGH-TECHNOLOGY EMPLOYMENT DEFINED BY INDUSTRY**  
**AS A SHARE OF TOTAL NONFARM, PRIVATE-SECTOR EMPLOYMENT**



Source: U.S. Department of Commerce, Census Bureau, County Business Patterns, <http://www.census.gov/econ/cbp/>.

Arizona's greater high-tech share historically and its decline over time relative to the nation is due to the manufacturing components. The manufacturing share dropped considerably in Arizona, fell to a lesser extent nationally, and remained steady in Nevada.

In the services components, Arizona's share was a little less than the nation throughout the time series, with the shares increasing nationally and in Arizona. Little increase in share was experienced in Nevada, which had a lower share throughout the 1998-to-2013 period than the nation or Arizona.

Relative to Nevada, Arizona's higher historical share, and its decline over time, in high-tech manufacturing primarily resulted from the semiconductor and other electronic components industry group. The difference in share narrowed to a lesser extent in the aerospace products and parts industry group and in the communications equipment industry group. Nevada has had a slightly higher share than Arizona in the communications equipment group since 2007.

In the services components, the share in Arizona generally has been the same or higher than in Nevada in each component, though in 2013, Nevada's share was a little higher in the scientific research and development group. Relative to Nevada, Arizona's share has increased a little over time in some components, particularly engineering services, but has dropped a little over time in other components, especially telecommunications.



## **Imports and Exports**

In a state, the exporting of goods produced in the state to customers in other states or nations is an important economic driver, bringing money into the economy. Similarly, importing goods produced in other states or countries causes money to leave the state. International imports and exports and interstate exports and imports have a comparable impact on a state's economy, but data are available only for international imports and exports — from the U.S. Department of Commerce, Census Bureau. The importing/exporting of services has an economic effect comparable to that of goods, but no services data are available by state.

### **Imports**

Import data by state are divided between manufactured goods and other goods, such as agricultural and mining commodities. The import data by state are available only back to 2008 and should be considered to be only rough estimates since the value of imports cannot always be assigned by state. If a shipment is destined for multiple states, all of the shipment is assigned to the state with the greatest value. If the destination is unknown, the value is assigned to the state of the ultimate consignee or the state where the entry is filed.

Imports of both manufactured goods and of other commodities as a percentage of GDP have been considerably lower in Arizona and Nevada than the national average. Relative to Nevada, Arizona's figures generally have been somewhat lower for manufactured items, the primary category, but higher for other commodities. In 2014, Arizona's overall import share of GDP was 6.9 percent, compared to 5.8 percent in Nevada.

The list of Arizona's top imports in recent years (2011 through 2014) largely has consisted of high-technology goods, though tomatoes have ranked second or third in each year. More than one-third of the import value has come from Mexico, with China ranking second. Canada, Japan and Malaysia also have ranked in the top five in each year.

High-tech goods also have been among the leading imports to Nevada. Token-operated games and diamonds generally have also been among the top five. China accounted for one-third or more of the total import value in each year. Canada and South Korea have ranked second or third. Mexico, Taiwan and Malaysia also have been among the top five in some years.

### **Exports**

Exports by state are divided between manufactured goods, other goods (such as agricultural and mining commodities), and "re-exports." Commodities imported into the United States that are processed in the United States and then exported are placed in the re-export category. The export data by state are available back to 1996. The export data are more accurate than the import data, but do not necessarily reflect commodities manufactured, grown or mined in a state. Instead, the export data reflect the transportation origin—the state from which merchandise begins its journey to the port of export. If shipments are consolidated, the consolidated shipment is assigned to the state where the consolidation occurred.

Total exports as a percentage of GDP were higher in Arizona than the national average from 1997 through 2006, but the size of the differential shrunk over this time. In 2014, Arizona's figure was 21 percent below average. This downtrend in Arizona's export share relative to the

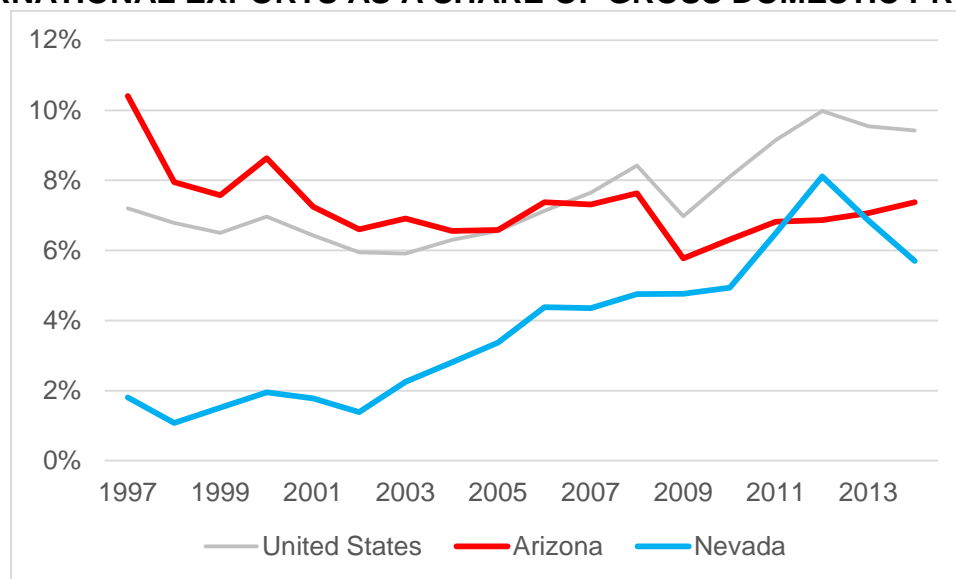
nation is due to the largest category of manufactured goods, for which Arizona's figure was above average from 1997 through 2004 but was 38 percent below average in 2014. Arizona's shares have been above average in the re-export category and near average in the other commodities category (except for being higher in 2013 and 2014). Relative to Nevada, Arizona's exports as a share of GDP have been higher in each export category, except for manufactured goods from 2011 through 2013.

Historically, Nevada had few international exports. However, total exports as a percentage of GDP trended up significantly from 2002 through 2012 (see Chart 22). This uptrend occurred in all three of the export categories. However, Nevada's export share remains lower than the national average in each category.

Arizona's leading export in recent years has been aircraft, which have accounted for more than 10 percent of the total value. Copper ore has ranked second or third, with a couple of categories of electronics also ranking near the top. More than one-third of Arizona's exports have gone to Mexico. Canada has ranked second. The United Kingdom, Germany, China and Japan have ranked among the top five in some years.

Gold has been Nevada's dominant export, accounting for between 36-and-52 percent of the total over the last four years. Copper ore has ranked second. Three commodities ranking high on the import list also have ranked high on the export list: diamonds, token-operated games, and electronic integrated circuits. Switzerland has been the leading destination for Nevada's exports, accounting for more than 30 percent of the total in each year. Canada, China and Mexico have been in the top five in each year, with Japan and India in the top five in some years.

**CHART 22**  
**INTERNATIONAL EXPORTS AS A SHARE OF GROSS DOMESTIC PRODUCT**



Source: U.S. Department of Commerce, Census Bureau, <http://www.census.gov/foreign-trade/statistics/state/index.html> (exports) and U.S. Department of Commerce, Bureau of Economic Analysis, <http://www.bea.gov/regional/index.htm> (gross domestic product).

## **ECONOMIC PERFORMANCE**

Measures of aggregate economic growth, such as GDP and employment, often receive the greatest attention, but the ultimate goal of economic development is to enhance the prosperity of an area, not to increase the area's economic size. Moreover, aggregate economic growth rates by state are not significantly correlated to the rates of gain in prosperity and productivity. That is, a state with fast aggregate economic growth, such as Arizona and Nevada, is no more or less likely to achieve gains in productivity and prosperity than is a more slowly growing state.

Over the 1969-to-2014 period, employment growth by state actually was negatively correlated to various measures of productivity and prosperity, though these correlations were not strong at between -0.22 and -0.35. During this period, employment growth in Nevada was the greatest in the country, but gains in productivity and prosperity were either the least or second lowest among the states. Arizona's employment growth ranked second, while gains in productivity and prosperity ranked between 42nd and 48th.

In each of the individual economic cycles during the 1969-to-2014 period, employment growth across the states was positively correlated to changes in productivity and prosperity, with correlations ranging from slight to moderate, but these relationships were not stable across multiple cycles. In each of these economic cycles, Nevada's employment growth consistently ranked at or near the top of the states, but only on one productivity/prosperity measure in one cycle did the state rank above the median. In Arizona, employment growth also was consistently among the leaders, but only during the 1991-to-2001 cycle did the majority of productivity/prosperity measures rank above the median.

In order to achieve gains in prosperity, increases in productivity must be realized. Thus, measures of productivity, such as GDP per employee are examined first in this section, followed by measures of prosperity, such as GDP per capita, then by aggregate economic measures.

### **Productivity and Prosperity**

At a regional level, there is no true measure of productivity. Measures such as GDP per worker and earnings per worker are used as proxies. A common worldwide measure of prosperity is gross domestic product per capita. In the United States, per capita personal income also is commonly used. Various other measures provide additional insight into prosperity.

#### **Proxy Measures of Productivity**

The time series of these measures are limited to the 1969-to-2014 period since these are the only years for which total employment figures are available from the BEA. GDP per worker in Arizona was a little greater than the national average from 1969 through 1975 and again in 1979 and 1980. It has been below average since then, trending down in an erratic pattern since the early 1970s. Relative to the nation, GDP per worker in Arizona reached its lowest point in 2014 at 10.7 percent below average.

GDP per worker in Nevada also was greater than the national average from 1969 through 1975. The state's figure slightly exceeded the nation from 1992 through 1996 and in 2005, but the ratio to the nation dropped sharply after that, with GDP per worker in Nevada falling to 9.8 percent

below average in 2014. GDP per worker generally has been lower in Arizona than Nevada, as shown in Chart 23, but the differential in 2014 was only 1.0 percent.

The ratios based on earnings per worker (see Chart 24) are similar to those of GDP per worker, though earnings per worker in Arizona has never exceeded the national average. Arizona's figure in 2014 was 11.1 percent less than the U.S. average. Earnings per worker in Nevada was consistently higher than in Arizona until 2011. Earnings per worker in Nevada fell sharply relative to both the nation and Arizona from 2007 through 2013; in 2014, Nevada's figure was 13.4 percent less than the national average and a little less than in Arizona.

Each of these proxy measures of productivity show that Arizona and Nevada each has declined relative to the nation since the beginning of the time series in 1969, though the declines in each state have been interrupted by periods of improvement. The magnitude of the relative decline has been greater in Nevada than in Arizona. However, these figures do not reflect changes in the relative cost of living. While no consistent measure of living costs is available for this long time span, various estimates of living costs have been made over the decades. These estimates suggest that the cost of living in Nevada fell relative to the national average during the 1970s, perhaps offsetting the large drops in the proxy measures of productivity during this period.

Earnings per worker can be divided into two components: income per proprietor and earnings per wage and salary employee. Earnings of wage and salary employees in turn can be divided into two components: wages and supplements to wages (benefits). Supplements include employer contributions to social security, retirement plans, health insurance, life insurance, workers' compensation, unemployment benefits, etc.

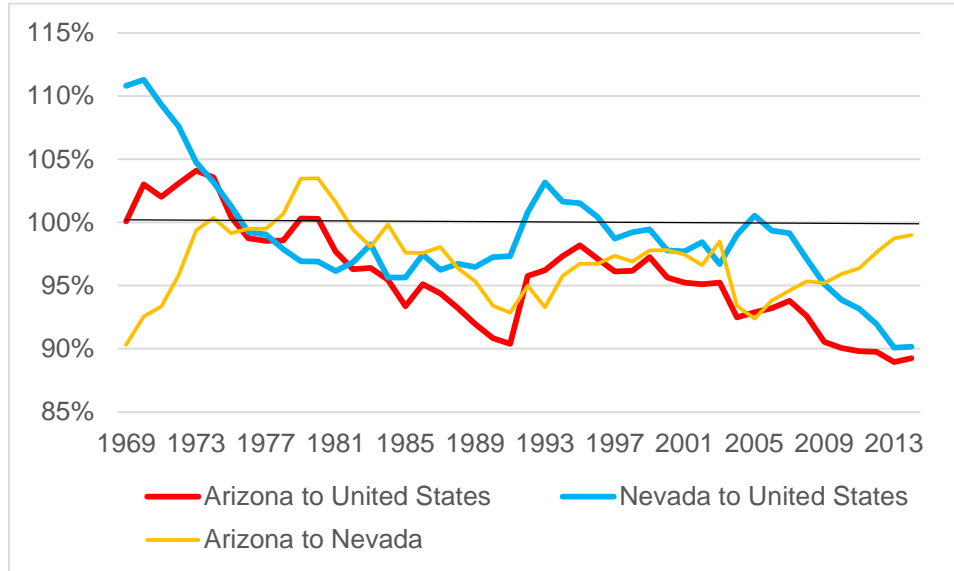
Earnings per wage and salary employee and average proprietors' income each followed the time series pattern of earnings per worker in Arizona and Nevada relative to the nation, though the swings in average proprietors' income were much larger in magnitude. In 2014, earnings per wage and salary employee was below the national average by 8.0 percent in Arizona and 9.9 percent in Nevada. Average proprietors' income relative to the national average was 28.3 percent lower in Arizona and 32.1 percent lower in Nevada in 2014.

The time series pattern of average wage per wage and salary worker has been quite similar to that of earnings per wage and salary employee in Arizona and Nevada. Relative to the nation in 2014, the average wage was 7.2 percent lower in Arizona and 10.7 percent lower in Nevada. In contrast, the time series of average supplements per wage and salary worker is different from that of the average wage, though both Arizona and Nevada have declined over time relative to the nation. In 2014, the average supplements figure was 11.3 percent below average in Arizona and 6.4 percent below average in Nevada.

### **Measures of Prosperity**

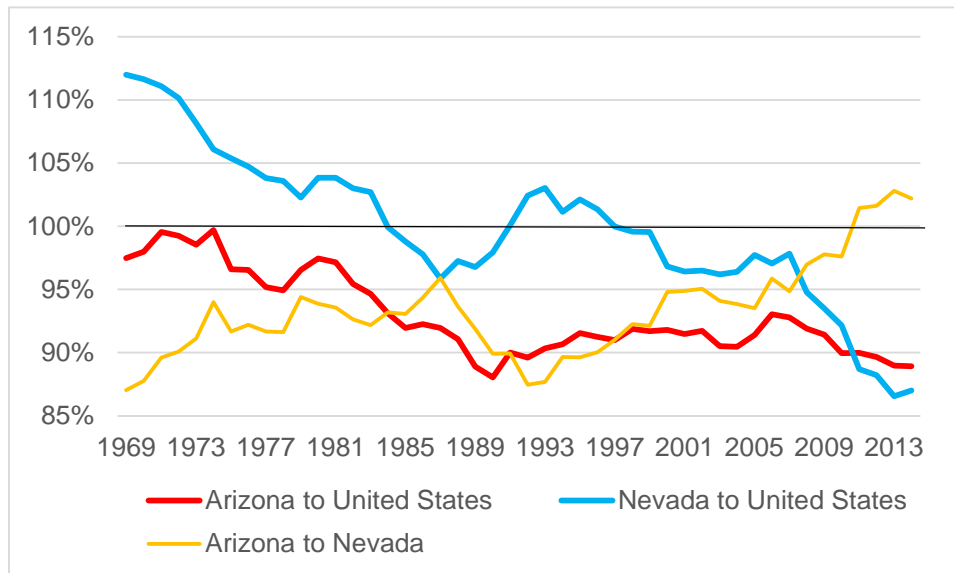
Estimates of personal income and its components extend from 1929 through 2014. Population estimates also are available for this time period. Thus a long history of prosperity measures related to personal income is available.

**CHART 23**  
**GROSS DOMESTIC PRODUCT PER WORKER RATIOS**



Source: U.S. Department of Commerce, Bureau of Economic Analysis,  
<http://www.bea.gov/regional/index.htm>.

**CHART 24**  
**EARNINGS PER WORKER RATIOS**



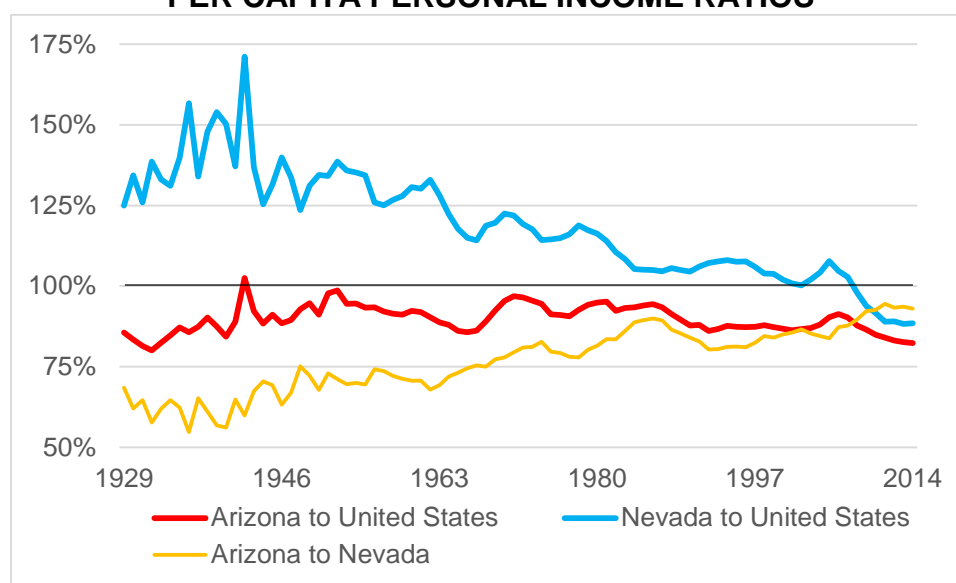
Source: U.S. Department of Commerce, Bureau of Economic Analysis,  
<http://www.bea.gov/regional/index.htm>.

Per capita personal income in Arizona relative to the national average fluctuates with the economic cycle. Like productivity, a downward trend also has been present since the early 1970s. As seen in Chart 25, the high point for Arizona's PCPI relative to the nation was 98.6 percent in 1952 (other than a brief spike during World War II) and the ratio reached 96.9 in 1971. Since then, the ratio has trended down, reaching a low of 82.3 percent in 2014. Only during the Great Depression (in 1931 and 1932) was the ratio lower.

Per capita personal income relative to the national average was erratic in Nevada through the first half of the 20th century, when the population was less than 160,000. Since then, the pattern for Nevada is similar to that of Arizona, though the magnitude of the downtrend has been greater in Nevada. In 1952, the ratio to the U.S. average was 138.6; it lowered to 88.3 in 2013 (the 2014 ratio was 88.5). Arizona's PCPI has been less than in Nevada in every year, though the differential has been less than 7 percent in recent years.

Personal income consists of three categories: earnings by place of residence; dividends, interest and rent; and transfer payments. The latter category includes such items as social security and unemployment insurance payments. In Arizona and Nevada, the ratios to the national average in the major category of earnings by place of residence have been similar to overall PCPI. The pattern in the other two categories has differed, though Arizona's per capita dividends, interest and rent has declined significantly relative to the national average since the early 1970s. Only in a few years has Arizona's figure for this category been larger than that of Nevada. In contrast, in most years Arizona's per capita transfer payments have been higher than the figure for Nevada, though Arizona's figure generally has been below the national average. In 2014 relative to the nation, per capita earnings was 21.3 percent lower in Arizona and 15.2 percent lower in Nevada.

**CHART 25**  
**PER CAPITA PERSONAL INCOME RATIOS**



Source: U.S. Department of Commerce, Bureau of Economic Analysis,  
<http://www.bea.gov/regional/index.htm>.

Per capita dividends, interest and rent were 19.5 percent below average in Arizona and 5.6 percent above average in Nevada. Per capita transfer payments were below average by 2.4 percent in Arizona and 16.1 percent in Nevada.

The earliest estimate of GDP by state dates to 1963; the first inflation-adjusted figures are for 1987. While the ratios to the nation are a little different for per capita GDP than for PCPI, the general pattern is the same. Arizona's per capita GDP figure was only 2.7 percent less than the national average in 1973 but was 21.2 percent below average in 2014. Nevada's figure has dropped from 29 percent above average in 1970 to 12 percent below average in 2014. Like PCPI, per capita GDP has consistently been lower in Arizona than in Nevada (see Chart 26).

The unemployment rate provides a very different indicator of prosperity. Limitations of the unemployment rate include significant margins of error in the estimates by state and the exclusion of individuals who have given up looking for work after a long period of unemployment. The earliest estimates of the unemployment rate that are available online are for 1976. As seen in Chart 27, the unemployment rate is highly cyclical nationally and in Arizona and Nevada, reaching its highest figures at the end of a recession and with substantially lower figures later in economic expansions.

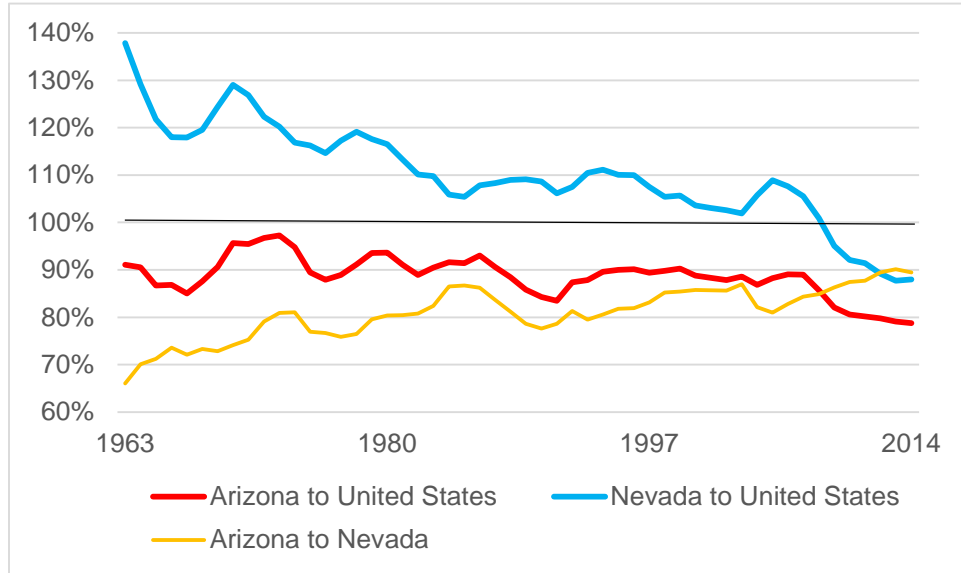
Since 1976, the unemployment rate in Arizona has fluctuated between being higher and lower than the national average. Arizona's rate tends to be higher during recessions and lower during expansions, but the rate in Arizona remained higher in 2014 despite it being the fourth year of expansion. The rate in Nevada also has fluctuated from higher to lower than the U.S. average. Nevada's rate has been unusually high since 2009. Until recent years, Arizona's unemployment rate usually was higher than the rate in Nevada.

Through the 2000 census, data on household income and poverty were available from decennial censuses; the data pertained to the year before the census date. Since then, the annual American Community Survey, which began nationwide in 2005, provides these figures. To reduce sampling error, five years of ACS data are combined.

*Median* household income has consistently been lower in Arizona than the national average (see Chart 28). In contrast, the figure in Nevada was considerably higher than the national average but in the last few years has fallen below the national figure. In the 2010-to-2014 period relative to the nation, Arizona's figure was 6.6 percent lower and Nevada's figure was 2.4 percent lower. While the trend is the same, *average* household income in Arizona and in Nevada has not compared as favorably to the national average. In the 2010-14 period, the shortfall was 9.4 percent in Arizona and 7.0 percent in Nevada. For both Arizona and Nevada, the PCPI ratios to the nation have been lower than the average household income ratios.

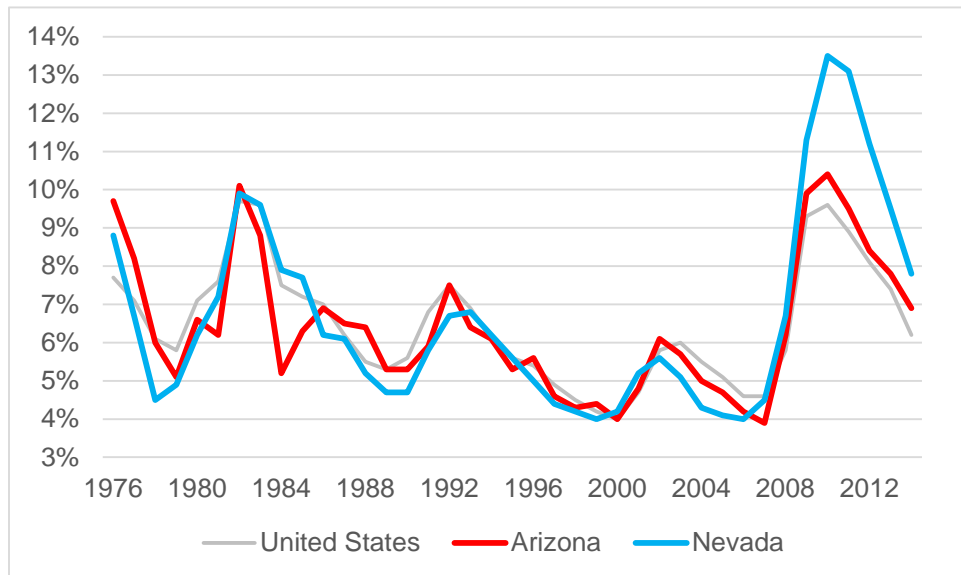
The poverty rate has consistently been higher in Arizona than the national average (see Chart 29). Historically, the poverty rate in Nevada was less than the national average, but in recent years has been similar to, or a little higher than, the national figure. In the 2010-14 period, the poverty rates were 15.6 percent nationally and in Nevada and 18.2 percent in Arizona. As noted earlier, the apparently stronger performance in Nevada in the historical period than in more

**CHART 26**  
**GROSS DOMESTIC PRODUCT PER CAPITA RATIOS**



Source: U.S. Department of Commerce, Bureau of Economic Analysis, <http://www.bea.gov/regional/index.htm>.

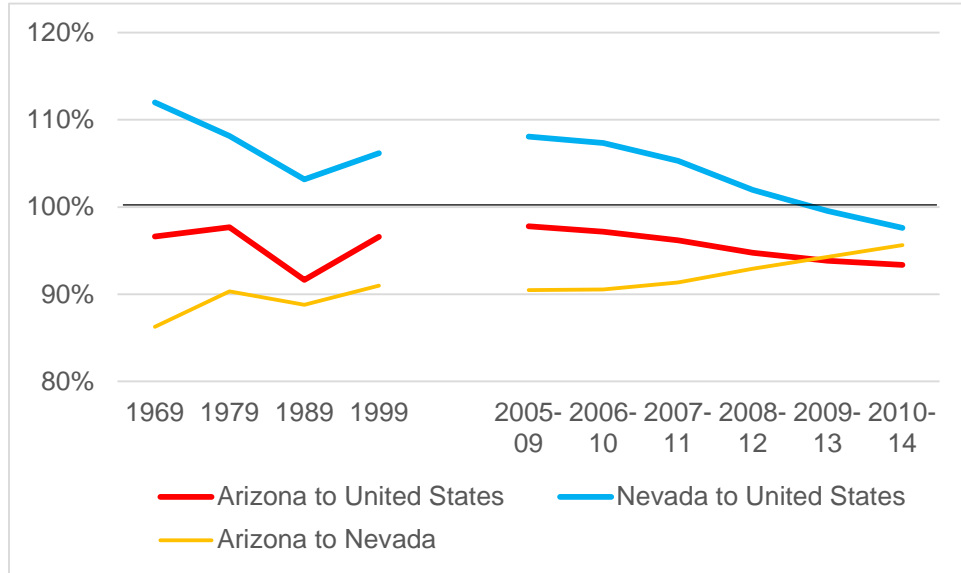
**CHART 27**  
**UNEMPLOYMENT RATES**



Source: U.S. Department of Labor, Bureau of Labor Statistics, <http://stats.bls.gov/>.

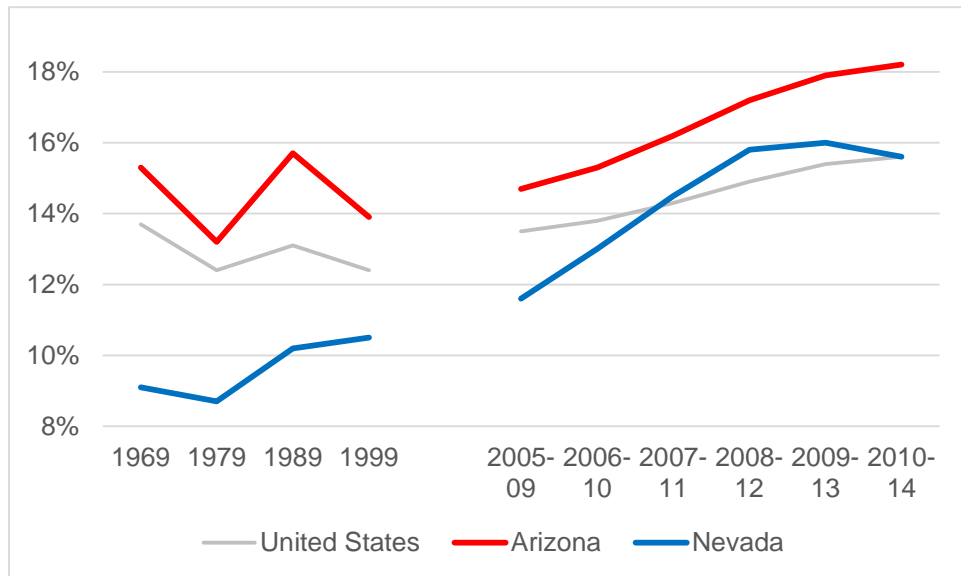


**CHART 28  
MEDIAN HOUSEHOLD INCOME RATIOS**



Source: U.S. Department of Commerce, Census Bureau, decennial censuses (1970 through 2000) and American Community Survey (2005 through 2014, Table S1901), <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.

**CHART 29  
POVERTY RATES**



Source: U.S. Department of Commerce, Census Bureau, decennial censuses (1970 through 2000) and American Community Survey (2005 through 2014, Table S1701), <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.

recent years on the income and poverty measures may in part reflect the state's higher relative cost of living in the historical period.

### **Aggregate Economic Growth**

In this section, aggregate economic growth is examined annually and by economic cycle. Nationally, economic cycles are officially dated by the National Bureau of Economic Research. Cyclical dates are not produced by state, but an analysis indicates that the timing in Nevada and particularly in Arizona typically is similar to the national average.

Nationally, the last recession extended from January 2008 through June 2009; the prior recession was dated from April through November of 2001. Put on an annual basis and dated from trough to trough, the prior economic cycle ran from 2001 to 2009; the current cycle began in 2009. However, the low point for employment was not until September 2010 in Arizona and Nevada. Thus, alternative dates (2009 and 2010) for the end of the last recession are used in this section.

Two measures of aggregate economic growth — inflation-adjusted (real) GDP and total employment — are the focus of the analysis in this subsection, but other economic measures also are examined. Total economic growth is addressed first, followed by growth by sector.

#### **Total**

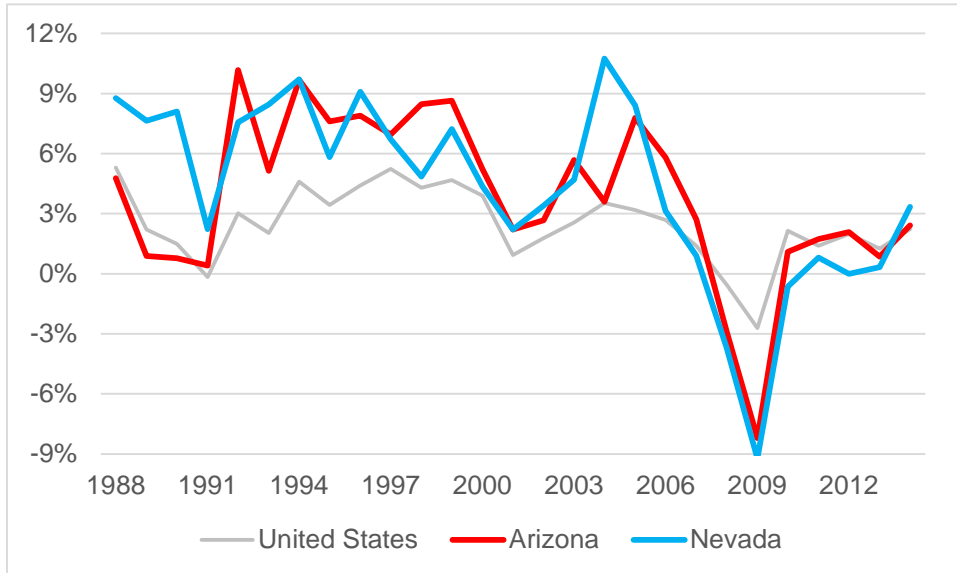
The historical record of annual aggregate economic growth for the nation, Arizona and Nevada is shown in Chart 30 for real GDP and in Chart 31 for total employment. Arizona and Nevada have more cyclical economies than the nation. Growth rates in both states typically are considerably above the national average during economic expansions. During recessions, the differential from the nation is smaller, with the percent change in Arizona and Nevada sometimes below the national average. Typically, the average growth rate over an entire economic cycle in Arizona and Nevada is much higher than the national average. However, the severity of the recession caused growth rates over the entire 2001-to-2010 economic cycle to be only a little higher in Arizona and Nevada than the national average.

For the four-year period of 2010 through 2014, real GDP and total employment growth rates in Arizona and Nevada were about equal to the national average, a significant change from the historical pattern. Growth rates in each year since the end of the recession have been similar in Arizona to the national average. In Nevada, growth was below average in 2011 and 2012, but by 2014 had accelerated to greater than the national average.

A comparison of growth rates in Arizona and Nevada shows an alternating pattern, with gains in Arizona occasionally more rapid than in Nevada for a few years at a time, but with Nevada more often growing faster. From 2006 through 2012, growth in Arizona was greater than in Nevada, but in 2014, Nevada's economy expanded faster.

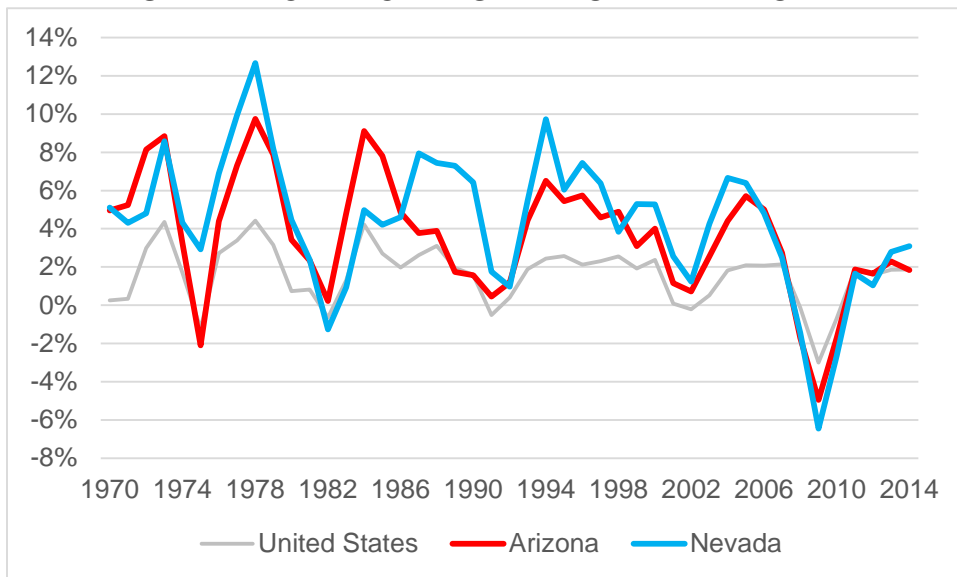
Another way of examining economic growth is to calculate the annual average percent change by economic cycle. These figures are shown in Table 12 for various measures. Nationally, economic growth during the 2001-09 economic cycle was subpar due to the magnitude of the 2008-09 recession. Since the current economic cycle is incomplete, average growth rates are difficult to

**CHART 30**  
**ANNUAL PERCENT CHANGE**  
**IN INFLATION-ADJUSTED GROSS DOMESTIC PRODUCT**



Source: U.S. Department of Commerce, Bureau of Economic Analysis,  
<http://www.bea.gov/regional/index.htm>.

**CHART 31**  
**ANNUAL PERCENT CHANGE IN TOTAL EMPLOYMENT**



Source: U.S. Department of Commerce, Bureau of Economic Analysis,  
<http://www.bea.gov/regional/index.htm>.

**TABLE 12**  
**ANNUAL AVERAGE PERCENT CHANGE**  
**IN AGGREGATE ECONOMIC MEASURES BY ECONOMIC CYCLE**

Cycle	US	Difference			US	Difference		
		AZ - US	NV - US	AZ - NV		AZ - US	NV - US	AZ - NV
Real Gross Domestic Product								
1970-75					1.6%	3.0%	3.4%	-0.4%
1975-82					2.1	2.9	4.0	-1.1
1982-91					2.1	2.1	2.9	-0.9
1991-2001	3.7%	3.5%	2.9%	0.6%	1.9	2.2	3.4	-1.2
2001-09	1.5	0.6	0.7	-0.1	0.6	1.1	1.5	-0.4
2009-14*	1.8	-0.2	-1.1	0.9	1.3	-0.1	-0.1	0.0
Real Personal Income								
1970-75	2.9%	3.0%	2.2%	0.8%	2.1%	2.7%	2.2%	0.5%
1975-82	3.1	2.6	3.7	-1.1	2.4	2.8	3.7	-0.9
1982-91	3.5	1.6	3.0	-1.5	3.6	1.4	2.7	-1.2
1991-2001	3.9	2.0	3.3	-1.3	4.1	2.5	3.1	-0.6
2001-09	1.5	1.5	1.3	0.2	0.8	1.1	1.1	-0.0
2009-14*	2.3	-0.6	-0.8	0.2	2.2	-0.7	-1.6	0.9
Real Earnings								

\* Incomplete economic cycle.

Source: U.S. Department of Commerce, Bureau of Economic Analysis,  
<http://www.bea.gov/regional/index.htm>.

compare to prior cycles, but so far are running higher than in the last cycle but lower than in earlier cycles.

Despite the slackening of growth rates nationally since 2001, the growth rates in Arizona and Nevada relative to the nation have dropped to well below the norm of the four economic cycles that occurred between 1970 and 2001. On each measure in each state, the average difference from the nation in the current cycle is the lowest of the six cycles, with the 2001-09 cycle ranking second lowest. The average growth rate in the current cycle is slightly higher in Arizona than in Nevada; in most of the prior cycles, Arizona's average was lower.

Nationally between 2001 and 2010, real GDP growth averaged 1.5 percent per year, compared to average employment gains of 0.5 percent per year. Thus, significant productivity gains, as measured by real GDP per employee, were realized. The differential in growth rate between the two measures was less in Arizona (1.9 percent for real GDP and 1.4 percent for employment) and in Nevada (1.8 percent for real GDP and 1.6 percent for employment). Between 2010 and 2014, growth rates for real GDP and employment were about the same nationally and in Arizona, while employment gains greatly outdistanced real GDP growth in Nevada.

### By Sector

In this subsection, sectoral changes in real GDP and total employment between 2001 and 2010 and from 2010 through 2014 are examined. In each time period, the percent changes, nationally and in Arizona and Nevada, vary widely between the real GDP and employment measures in a number of sectors, with greater gains in real GDP in some sectors and larger increases in

employment in other sectors. This analysis considers each measure in assessing growth rates by sector.

Nationally between 2001 and 2010, the educational services sector and the health care and social assistance sector were among the fastest growing on both real GDP and employment. The real estate sector also expanded at an above-average rate. In contrast, construction was the poorest-performing sector, though the loss in employment was greater in manufacturing. Like Arizona, Nevada's gain in educational services and losses in construction were more extreme than the national average, and the information sector also did poorly. Nevada also experienced strong growth relative to the nation in manufacturing, transportation and warehousing, and management of companies, but the tourism-related sectors of accommodation and food services and arts, entertainment and recreation experienced slower growth than the nation.

Arizona's sectoral performance generally was similar to the nation between 2001 and 2010, though the educational services sector and the health care and social assistance sector grew rapidly even compared to the U.S. average, while construction declined more than the nation. The information sector also did more poorly than the nation.

Between 2010 and 2014 nationally, the mining and management of companies sectors posted the fastest growth, with administrative and waste services and the tourism sectors also above average. Government and utilities dropped even during this period of overall economic growth.

Relative to the nation, finance and insurance and information had higher growth rates in Arizona between 2010 and 2014. Mining and wholesale trade grew relatively more slowly. A number of differences in the sectoral performance in Nevada relative to the nation were present. In particular, manufacturing and retail trade expanded more in Nevada, while construction and utilities lagged behind.

In order to provide a more up-to-date look at economic performance, the monthly employment estimates from the BLS were examined. These data are not comprehensive and the estimates for much of 2014 and all of 2015 remain subject to revision. For the six-year period from December 2009, near the end of the recession, through December 2015, the percentage increase in employment was 9.6 percent nationally and a little higher in Arizona (11.5 percent) and Nevada (12.2 percent).

Nationally, growth rates over the six years were below average at less than 7 percent in the mining and logging, other services, manufacturing, finance and insurance, and information sectors; employment was down 1 percent in the government sector. Growth rates exceeded 16 percent in the construction, administrative services, management of companies, accommodation and food services, and professional and technical services sectors. Arizona posted much stronger gains in information, finance and insurance, and arts, entertainment and recreation, but slower growth than in the nation in wholesale trade, professional and technical services, and real estate. Nevada's growth rate was considerably different from the national average in numerous sectors. Relative to Arizona, Nevada had larger increases in educational services, other services, manufacturing, wholesale trade, and real estate, but lesser increases in finance and insurance and arts, entertainment and recreation.

# THE PRODUCTIVITY AND PROSPERITY PROJECT

The Productivity and Prosperity Project: An Analysis of Economic Competitiveness (P3) is an ongoing initiative begun in 2005, sponsored by Arizona State University President Michael M. Crow. P3 analyses incorporate literature reviews, existing empirical evidence, and economic and econometric analyses.

Enhancing productivity is the primary means of attaining economic prosperity. Productive individuals and businesses are the most competitive and prosperous. Competitive regions attract and retain these productive workers and businesses, resulting in strong economic growth and high standards of living. An overarching objective of P3's work is to examine competitiveness from the perspective of an individual, a business, a region, and a country.

## THE CENTER FOR COMPETITIVENESS AND PROSPERITY RESEARCH

The Center for Competitiveness and Prosperity Research is a research unit of the L. William Seidman Research Institute in the W. P. Carey School of Business, specializing in applied economic and demographic research with a geographic emphasis on Arizona and the metropolitan Phoenix area. The Center conducts research projects under sponsorship of private businesses, nonprofit organizations, government entities and other ASU units. In particular, the Center administers both the Productivity and Prosperity Project, and the Office of the University Economist.

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